

# A RICH CABINET,

WITH  
Variety of Inventions :

Unlock'd and open'd, for the Recreation of  
Ingenious Spirits at their vacant hours.

Being Receipts and Conceits of severall Na-  
tures, and fit for those who are lovers of Na-  
tural and Artificial Conclusions.

AS ALSO  
Variety of Recreative Fire-works both for *Land*,  
*Air*, and *Water*. And Fire-works of Ser-  
vice, for Sea and Shore.

Whereunto is added divers Experiments in *Drawing*,  
*Painting*, *Arithmetick*, *Geometry*, *Astronomy*, and  
other parts of the Mathematicks.

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Collected by *J. W.* a lover of Artificial Conclusions.

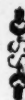
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The Fourth Edition, with many Additions.

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LONDON,  
Printed for *William Whitwood* at the sign of the  
Golden Lion in *Duck-Lane* near *Smith-field*.  
1668.

CABINET.



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TO  
ALL LOVERS  
of Ingenuous and Arti-  
ficial Conclusions.

**C**ourteous Reader, (you know and I know, that) the Wits of this Age are acute and various, therefore how to please all mens fancies, is a Task so ponderous for my undertaking. I have here unlock'd and open'd to your view a rich Cabinet of varieties; if there be any thing therein contained that may yield you profit, solace of the mind, recreation of the spirits, or content, I shall think my labour well bestowed, and be glad; If it be otherwise, I shall be sorry that I have nothing therein to please your mind, intreating you to shut down the lid again, and then I hope there is no hurt done.

This may be compared to a Garden composed of sundry varieties, wherein you may pick and cull out those Flowers that best please you, and are fittest for your pleasure or profit: For the laborious Bee gathereth

## The Epistle.

thereth her cordiall Honey, and the venomous Spider her corroding poison (many times) from the same Flower. And I know that there are some envious Criticks that will snarl at me for publishing many things contained herein; But I care the less, because I aim at the publick (and not my own private) good; and no man (I think) should be born only to himself, and hide his Talent: And therefore these few Receipts which I have Collected, with divers of mine own (gentle Reader) I dedicate freely to thy use; Knowing that Art imitating Nature, glories alwayes in the variety of things which she produceth, to satisfy the minds of curious Inquisitours of Natural and Artificial Conclusions. Therefore I doubt not but there are many things contained in this small Volume, that will give satisfaction to the Ingenious, for whose sakes I have compiled it: So taking leave, I will ever remain,

An Artists Friend,

JOHN WHITE.



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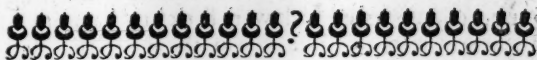
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## A rich Cabinet with variety of Inventions.

### RECEIT I.

*How to make a glorious light with a Candle, like  
the Sun-shine.*



**HIS** is a rare Conceit, and fit for those Artists, or others that perform curious and fine works by Candle-light: as Jewellers, Ingravers, or the like, or those which are weak-sighted to read by, never dazling the eye.

Go to the Glass-house, or Glass-shop, and let them blow you a thin round Globe-glass, bigger than a penny Loaf, (the bigger the better) with a short neck like a bottle, they know how to make them. When you have this Glass, with Glew or Wax bind a piece of Tape or Pack-thread, about the neck or top making a little loop there-with to hang by; then fill your Glass with the purest Conduit or Spring-water you can get (putting some Aqua-vitæ therein to keep it from freezing) stopping it close, to keep the dust out; having thus done, if you will use it at a Table or Bench, knock a Tenter-hook or Nail into the Ceiling or Shelf, and with a

B

Tape

Tape or Pack-thread fasten it to the loop, and hang it up; ( but a round stick were better to hang it on, Putting it into a post or hole in the wall, that you may let it higher or lower at your pleasure in turning the stick; ) then behind your Glasse set a Candle lighted upon the Table, and you shall have a glorious light through the Glasse and water for your purpose; behold the Figure following.



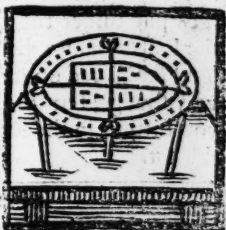
Some use to place a sheet of oiled paper betwixt them and a candle, and this will cause a good light.

## RECEIT II.

*How ( for a Wager ) to cleave a thin Groat , or other piece of Silver in sunder, like two Groats.*

**T**HIS to many will seem impossible, yet may thus be done. Take three small pins, and prick them down upon a board, or table triangular wise; and then take a thin whole Groat, and lay it level on the heads of the three Pins, as you see in this same Figure; having thus done, take a piece of Brimstone and

and bruise or beat it to powder, covering the Groat therewith, all over, in a pretty thickness, and then with a lighted piece of paper, or a candle, set the Brimstone on fire untill it be consumed; when this is done, and the fire out, you shall see the edges to open a little like a dry Oister, then take a Knife and put into it, and it will easily cleave in sunder, having the impression on both sides very perfect.



### RECEIT III.

*To lay one end of a staffe or stick upon a stool, or table; and to hang a Pail full of water at the other end, having nothing to hold on the Stick, nor nothing under the Pail.*

**T**O performe this conceit, do thus, Lay one end of a Staffe or Stick a pretty way upon a table, or Stool (so that it role not off) letting the other end hang over the table likewise, (as you may see in this Figure here expressed,) then take a Pail full of water, and hang the bayle or handle upon the same; but you must have another short stick that will reach just from the inside of the bottom of the pail,



to the long stick on the table, placing the short stick just under the bale very stiffe, and then shall the Pail of water hang from the ground upon the long staves end on the table without falling, seeming very strange, but this is something difficult at first, till you hit just in the center of gravity: yet I have often done it.

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RECEIT IV.

*How to make dainty sport with a Cat.*

**I**F you will have some sport with a Cat, then get a little Bell, such as the tame Hawkes have at their legs, and tye the Bell something hard at the end of the Cats taile, and let her go, she feeling, of her tail smart, and hearing of the Bell gingle, she will run up and down as if she were mad, flying against the walls and windows: then if she can, she will get into some hold to hide her self, but when she wags her taile never so little, then out she comes, and is as mad as before, and never will rest in quiet till it be taken off, or she can get it off her self.

*Another.*

Some have shod a Cat round, with putting melted Pitch into four Walnut-shells, and placing her feet therein, and she will make pretty sport.

*Another.*

I was told of a merry Fellow that came into an Ale-house in cold weather, and finding but a reasonable Fire, said, He would make the Cat piss it out, and watching his opportunity, he getteth his Hostesses Cat, putting her head betwixt his thighs, and

and holding her four feet fast in one hand, and with the other hand held up her taile near the fire, and did pifs such aboundance that she quite quenched the same.

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RECEIT V.

*How to make very pretty sport with Ducks, or Poultry.*

ONE Summers day my self and two or three Friends, walked into the Fields for our recreation, and being dry and hungry, we went to a Victualling-house in a Country Village, where we could get nothing to eat but Bread and Cheese, and sitting in an Arbour, the womans Ducks being neer us, we flung them our parings of Cheese, the Ducks were very greedy of the same, ( then quoth one of our Company ) I will shew you some sport.

Presently he getteth about a yard of strong thread, and finding a little rag of red cloath, tyeth it to one end of the thread, and at the other end tyeth a piece of Cheese ( some what lesser than a Bean ) with part of the rind on, and throweth it amongst the parings to the Fowle, presently one of them swalloweth it down, now the rest of the thread and the Rag dragged behind her, and she wadling up and down, perceived the red Rag to follow her, of which she was sore afraid, then she did run from place to place, not knowing what to do, at length she took wing and flew into a Pond of water, and there she quackt, but presently she espy'd the rag to swim after her, then down she dived, then up a-

gain, then down, then up, at length out of the Pond again in her former posture, at which the Woman was amazed, and thought her Duck was bewitched : But at the length the threed was tangled at some bush or other, and so broke, or pulled the Cheefe out of her belly, and then she was quiet.

The like sport you may have with other Poultry, by tying a long white Goose-quil, ( or a light stick with a rag on the top ) upright at her tayl.

#### RECEIT VI.

*How to have pretty sport at Cock-fighting, with a single Cock.*

**T**AKE a pretty big Looking-glass, and set it against a wall on the ground in any Room or other place ( not full upright, ) tying the string of the Glass with a nail to keep it from falling : then put a Cock into a room, and throw some crumbs neer the Glass, and when he seeth his picture therein, you shall have dainty sport with him, for he will fight vehemently with his own shadow, supposing there is another Cock, for as he moves, so doth his shadow : sometimes with his motion he loseth it, and then he will look behind the Glass for the other Cock, and not finding him, he will clap his wings and crow, as though he had got the victory : but spying it again he will begin a fresh battle.

If you please, you may hold the Glass in your hand moving it up and down, and he will do the like.

RECEIT



## RECEIT VII.

*How to know the hour of the day or night at any time  
by a Ring and a Glas, being a dainty clock.*

**T**AKE a small Threed, and put it through a Gold Ring, or other like Ring, and doubling the Threed, tie a pretty big knot at the end, and cut it off, let the doubled Threed be seven or eight inches long, then take a Bole-glass, and set it on a Table, and hold the knot of the threed something hard betwixt the ends of your fore-finger and your thumb, as you see here in the figure, which will cause the Pulses of your wriit to beat; let the Ring hang in the middle of the glass a little within the rim, then the working of your Pulse will make the Ring to move striking upon the sides of the Glas the houre of the day or night, and then the Ring will stand still again.



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## RECEIT VIII.

*Another excellent Rule, to know the houre of the  
Day or Night at any time.*

**I**F any two ( or more ) Parties be in company together, let one of them take something from the ground, ( what they please ) and give it to another Party standing by.

Now, if the thing taken up hath grown, and may grow again, as Seeds, Hearbs, or the like, it is then 1, 4, 7, or 10. of the Clock, or very near.

If it did never grow, nor never shall, as Stones, Metals, Pot-sheards, Glass, or the like, it is then 2. 5. 8. or 11. of the Clock, or very near.

But if it hath grown, and will never grow again, as Sticks, Chips, Shels, or such like, it is then 3. 6. 9. or 12. of the Clock, or very near.

*But remember this Caution.*

That both they that give the judgement, and they that take up the thing, doe not know what hour it is before they try the Conceit.

RE-

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RECEIT IX.

*How to spit three Capons upon one spit at once, and to have an equal fire at each of them, yet one shall be quite raw, the other be well boyled, and the third thoroughly roasted.*

I Have heard that this Conceit was performed by a Noble-mans Cook upon a Wager, and thus he did it. To tend the first Capon he had a Boy that continually basted and poured cold water on the same, and so kept it raw.

To the second, he had another like attendant to paste, and pour continually seething and scalding water, and that was well boyled.

The third he tended himself, basting it with Butter, and that was thoroughly roasted, and so he won the wager.

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RECEIT X.

*How to make two Knives (with a short stick) to hang upon the brim of a Glasse without falling.*

TAKE a little stick, some four inches long, and make it sharp at one end like a Butchers Scure, and then get two Knives, somewhat of an equall poise, and prick the points of them towards the bigger end of the stick, on each side slope-wise, as you



you may see here, in the Figure; then put the small end of the stick upon the rim of a Glasse of wine or beer, & you may take up the Glasse and drink, and they will not fall off.

### RECEIT XI.

*A speedy way how to make a Horse fat, plump, and lusty.*

**T**AKE *Commin-seed*, *Annis-seed*, *Enula-campana*, and *Turmerick* a penny-worth of each, seeth them well with three heads of Garlick in a Gallon of Ale, then strain it, and press out as much of the substance as you can well wring out, and give it your Horse to drink bloud-warme, a full quart at once, then ride him till he be hot, then afterward stable him, curry and litter him well untill he be cold, do this two or three mornings together, and then turn him to grass, and he will thrive wonderfully in a short time: if there were a handful of *Groundsell* sodden with the afore-said ingredients, it would do well.

Now if you will not put him to Grass, but keep him in the Stable, give him to eat with his Proven-der some of the roots of *Enula-campana*, with some *Commin-seeds* beaten together, or the *Enula-Campana* shred

ere, hred small, shred for fourteen daies together, this  
hen will make a lean Horse to thrive, and grow fat in  
end one moneth more than he would otherwise have  
pon done in a quarter of year.

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RECEIT XII.

How to keep a Horse from tiring by the way, and to  
make him foame at the Bit.

WHen you are to ride; and fear that your  
Horse may tire, carry with you ( in some le-  
thren Bag) a good quantity of the powder of *Enula-*  
*sampna*, and when others do bait their Horses in  
their ordinary manner, your Horse being first well  
walked, rubbed and littered, then give him a good  
handful of your powder, in a quart of strong Ale or  
Beer, with a horne, tying his head high to the rack,  
and you need to give him no other Provender, ( or  
very little ) till night, then let him be well meated,  
and give him in the morning two pennyworth of  
bread, and his Ale and Powder, but remember to  
do water at night.

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RECEIT XIII.

How one may put his finger, or wash his hands in melted  
Lead, without danger, or burning.

TAke an ounce of Quick-silver, two ounces of  
good Bole-armoneack: half an ounce of Cam-  
phire, and two ounces of Aqua-vitæ, then mingle  
them

them together, and put them into a brazen Morter, and beat them with a Pestle, having thus done, anoint your hands all over thoroughly well with this ointment, and then you may put your finger into melted Lead, or you may wash your hands therewith, if one pour the Lead upon them, and it will neither scould nor burn you.

#### RECEIT XIV.

*A very pretty and ready way to teach Children or others suddenly to learn their ABC in manner of play.*

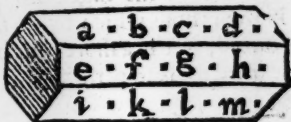
**C**Ause for pieces of Bone or Wood to be cut into six square like Dice, and upon every side or square let one of the letters of the Alphabet be ingraven or writ, as, A B C D E F upon one of them, then G H I K L M on the other, and so of the rest in order, as you may see here in the Figure.

Now the Child taking delight, and using to play with them (amongst other Children) and being told what Letters are uppermost, will soon learn their Alphabet, as it were by the way of sport and pastime.



Also, you may cause one piece of bone or wood to be made into six long square sides, about an inch and a half of length and let each side be ingraven, or written with four Letters as a b c d and so of the rest of the sides, and let them throw

throw it, and name those Letters which are uppermost; and when they have learned the great Letters, you may write the small Letters on, as it is here on the Figure.



## RECEIT XV.

*An excellent way to teach one to read speedily, and truly, that before could not distinguish their Syllables.*

LET a Scholar, or one that can read well, take any Book of small value, and at every Syllables end underneath, or at the top with a small Pen of Inke, let them make a little speck or mark: but if the speck or marke were made with red Inke it were the better; Or if it be in a Book that you would not deface, then take a small Pin, or Needle, and prick little holes at each Syllable, which will hardly be perceived. This experiment is best to be made with hard words of many Syllables, as in the example following.

Abraham, Achitophel, Bartholomew,

Christopher, Demetrius, Anabaptist,

Mathematician, Nebuchadnezar, Quo-

tidian, Patrimony, &c.

These

These to the ingenious will suffice, for I have known those which by no means could be brought to read, yet in a short time by this method they have learned to read perfectly.

## RECEIT XVI.

*Of divers rare and dainty conceited motions, performed by the operation of the Magnet, or Load-stone.*

**M**Any and wonderful Mathematical conclusions are performed by the *Magnet*, or *Load-stone* only I will give a touch at some few for recreation.

These stones are to be had at the Iron-mongers but they ought to be polished and made fit by a cunning Artist. This stone hath his two Poles, one North the other South, answerable to the Poles of the World. For if you take a peice of four or five Inches long and touch one end thereof with a Load-stone: and then thrust it through a piece of Cork, putting it to swim in a Bason of water, presently you shall see one end of the Wyre will turn full North, and the other full South.

This receipt is profitable for some Travellers, who having a Sewing-needle about them that is touched with this stone, may prick it in some little light piece of wood or Corke, and place it in the water, and it will set out the North and South instead of a Compass.

If for recreation you take two Wyres, and put each Wyre into a Cork, touch one Wyres end with the North end of the Stone, and the other Wyres end with



with the South end of the stone, and then put them both into a Bason of water a pretty way asunder, yet they will begin to move and stir, and draw nearer together, and on the sudden joyn and meet: Now if upon those Wyres or Corks there were placed little paper Tilters on Horse-back, they would run their course at one another in the water very prettily.

Also, if this stone or Magnet be inclosed in a box of Wood, Stone, Silver, or Brasse, yet it will extend its operation and working by many pretty and ingenious practices, admirable to behold.

As for example, if you will make the formes and pourtraictures of divers things in thin Past-board, as Horse-men, Foot-men, Ships, Boats, Beasts, Birds, Flies, Wormes, Serpents, or the like, you may closely convey into them a short piece of Wyre, and then upon a Board, Trencher, or Past-board, and if you will have them move or walke, then hold the Load-stone close in your hand, under the Board, and that way which you move your hand underneath, that way the images will move and creep on the top.

Also, if you place the Load-stone privately to, or near the Cieling, or over a Door, and then hold a piece of Iron near to it (tying a threed to the Iron) that it touch not the stone, which will attract it, and when the Iron will seem to hang in the Ayre. If you touch an Iron Ring with this stone, it will take up dozen or more rings together, hanging one to the other like a chain. Also, if a knives point be touched therewith, it will take up Needles or wyre, and by it you may know the counterfeit, or New-gate half-penny, as some call them.

Many

Many other rare conclusions may be performed by this stone, which I forbear to write of. Fire, Garlick, or Onions, spoileth the vertue of this stone; therefore let it not touch or come near them.

## RECEIT XVII.

*The making of the Thermometer, or Weather-Glass, whereby you may certainly fore-tell the alteration and change of the weather, a good many houres before it commeth to pass.*

**T**His Weatherglass is compos'd of a quantity of Water and Aire Artificially inclosed therein, the water being subject to a continual motion (either up-ward or down-ward) as the weather changeth. The Glasses you may have ready made at the Glass-shops, but be sure to chuse the longest and slenderest shanked Glasses, with a small head, for they are best. You must also have another Glas for a Cistern at the bottome to receive the water, the framing of it is thus.

Make a frame taper-wise of some fine light Deal or other wood, (only let the bottome board be somewhat thick and heavy to make it stand the steadder,) and let the head or uppermost board be lesser than the bottome, having a hole in the middle to put the Glas through, as you may see in the Figure.

Your

Your Frame should  
 be about a quarter of  
 an inch longer than  
 the shank of the glasse  
 because the lower end  
 of the shank should  
 almost reach to the  
 bottom of the cistern :  
 Now before you put  
 in your Glasse, you  
 must divide the shank  
 into certain degrees,  
 from 1 to 12 or more,  
 beginning from the  
 rim of the Cistern,  
 upwards, placing fi-  
 gures thereon, having  
 thus done, turn the  
 Glasse head of your long  
 glasse downward, and  
 with a Funnel fill it  
 almost full of water, then put the Cistern on the bot-  
 tom board, and holding the frame sloping, put the  
 shank of the Glasse (through the hole at the head)  
 into the Cistern, and then set it upright. Now you  
 must know at what degree to set your water, accord-  
 ing to the season of the year : for if it be in Summer  
 and very hot weather, then to set it at one or two deg-  
 rees best, if the weather be temperate, than three or  
 four, but in cold or frost set it at nine or ten. To hit  
 these degrees, (if your water be not low enough) you  
 must pull up your Glasse a very little way from the  
 C bottom



bottom of the Cistern, and very suddenly put it down again, if yet it be not at the right degree, pull it up again; and quickly down (as before) till you have your desire.

But take heed, for if your water be fallen too low in the Cistern, then you must take them out, and begin your work again; When it is thus done, wax or cement your Glas and Cistern together, and then you may cover and make a rock about your Cistern, with Past-board or the like, glewing or pasting pieces of Mother of Pearl shels, Smiths Cinders, pieces of Glas, Antimony, or other shining things, what best pleaseth your fancy; or you may cover it with Moss, or the like, and it is finisht.

The quality of the water in this Glas, is to ascend by degrees with cold, and to descend with heat: for in the Winter the water will be at the top of the Glas, and in Summer down to the bottom. The water ought to be very clear, and coloured by Art, both for ornament, and the plainer to distinguish it from the Glas: If you will have it green, use Verdigrease, if yellow, use Saffron, or Turmerick, if red, use Brazil, or Turnsoil.

*The use and property of the Glas.*

By the uncertain motion of the water in this Glas it is a certain sign of sickle and unconstant weather, but contrary, the continuance of the water at any one degree, is a sure token that the weather will continue at that stay it is then at, whether it be fair or foul, frost or snow. But when the water either riseth or falleth, the weather will then presently change: Also, the sudden falling of the water is a sure token of wet weather.

R E.

RECEIT XVIII.

A pretty way to catch Kites, Ravens, Crowses, Magpies, or the like, alive.

GOE to the Apothecaries, and bestow two pence for *Nux vomica*, then beat them to powder, or se it as you do Ginger, this being done, take raw flesh or Liver, and cut it into little pieces or gobbets, that the Fowl may swallow them whole, then cut holes in the same, and put your powder or slices there- of, and then lay these pieces where they haunt, but as soon as they have swallowed down the same, they will flye to the next high Tree they can come at, and this presently makes them so drunk, or sick, that they might fall down from the top of the tree to the ground, that you may take them up alive with your hand: But you must be sure to watch them, and run presently to the tree, for they will soon recover and flye away.

I believe if it were sodden with other Grain, it could have the like operation with other Fowl.

RECEIT XIX.

A ready way to catch Pidgeons, or other Fowl.

TAKE pieces of brown Paper, and roul them round making Coffins of them, such as the Grocers make to put their Fruit in, let them not be above a finger long, paste the sides and ends of them with fine starch, clip the upper part of them round with a pair of Sheers, then anoint the inside of the uppermost skirts of them round about with Birdlime, some stufte that will but cling to the Feathers: But

you must ( a day or two before you use it, ) lay  
strew some Pease or other Grain to make the  
haunt the place, and they will be the less fearful  
then if you please make a hole in the ground a little  
way and put your Coffins upright or sloping therein  
a few Peason or Corn in them, strewing here and  
there Peason near them, and when she picketh, into  
the coffin she is immediately hooked, and blindfold  
ed, not seeing which way to flye, and thus you may  
take them easily.

### RECEIT XX.

*A merry Receit, being a ready and sure way how  
to catch a Pick-pocket.*

**A**S I was writing the former Receit, it put me  
in minde of a pretty conceit that a Friend once re-  
lated to me, which was thus : A Gentleman being  
a throng in a Fair, had his Purse pickt out of his  
pocket; he missing it was somewhat vext, but could  
not mend it, but studied how (if he could) to be re-  
venged : presently he buyeth two penny-worth  
Fish-hooks, and causeth a Taylor to sew them round  
about toward the upper part of his pockets, with the  
points of them down-wards, and so the next day again  
he goes to the Fair again amongst the throng  
throwing his Cloak on one shoulder, seeming care-  
less of his pocket, wherein he had store of money.  
Presently there was a Diver nibling at the bait, and  
nimbly had his hand in his pocket : The Gentleman  
being wary (perceived that the Fish had swallowed  
the hook) gives a jerk aside, which caused the hook

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Gentleman  
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to catch good hold in his hand, and then he had him sure: Then said the Gentleman, Fellow, what maketh thy hand in my pocket? O good Sir, (reuerently the Pick-pocket) pardon me, I cannot pull it out: Come (saith the Gentleman softly to him, because no body should take notice) go along with me: so cheek by joll they walked together, with his hand fast in the pocket (but covered with his Cloak) and so to a Tavern lovingly they go together, where the Gentleman told him of the loss he had sustained the day before, and making of him to restore back his money, he cut out his pocket, and let him goe. Surely this Pick-pocket had good store of picking work to get the hooks out of his hand again.

RECEIT XXI.

How to make Fowls and other small Birds drunk, that you may take them with your hands.

**Y**OU must observe what meat they love, or use to eat, as Wheat, Barley, or other Grain, and lay the same to steep in the Lees of Wine, or in *Aquas* or in the juyce of Hemlock, and strew the same grain in the places where the Birds do haunt.

*Another.*

Take Tormentil, and boyl it with strong Wine, Wheat, Barley, or other Grain, then strew this in those places where you intend to take them, or where they use to haunt, and the Birds will eat the pieces amongst the grain, which will make them so drunk that they cannot flye away.

C 3

*Ans.*

*Another.*

Make PASTE with Barley meal, Onion blades, and Herbane seeds, and put or throw it where the Bird do haunt.

These experiments are best to be done in Winter in a deep Snow.

## RECEIT XXII.

*A dainty way to catch Fish in a dark night, with a Candle under Water.*

**G**ET an Urinal, and put pretty soft clay therein and with something that is flat at the end press the clay gently to the bottom of the glass, smoothing it as well as you can, then take a stick, and shape it about the bigness of a Candles end, wet the stick, and put it into the neck of the glass, making a hole in the middle of the clay, as you make clay candle-sticks then make a little hoop of a Willow stick, and put pieces of Cork in four places of the hoop equally distant, and get a thin, light, round piece of board and with four little sticks of an equal length, tie one end of them to the Corks, and the other ends fasten to the board to support it, as you may see here in this Figure.



In the board you must make a hole in the middle to put the neck of the Glasse through and there tye it, and make a loop with a string to the board, that you may with a long-pole put it into the water: when you will use it, put your Candle into the glasse in the clay socket, a little below the brim, that the



wind blow not the light out. If you please, you may with Wax or Glew put little pieces of Looking-glasses, or other Glasse under the board, on the side next the water, and this light will shine a great compass in the water, and the Fish will streight resort to the same, where you may very easily take them with a Net.

This might be done with the Glasse alone, by tying Corks about the neck of the Glasse, to keep the mouth above water.

### RECEIT XXIII.

*An excellent Bait to catch Fish with an Angle.*

**M**ake Paste with fine Wheat-flower, tempered with a little Saffron and Sugar, and bait your hook therewith, and they will bite apace. This is a good bait for Roach, Dace, and such like.

*Another.*

Take the crum of a new penny White-loaf and an ounce of *Coculus India*, and an ounce of Henbane-seed finely powdered, temper the same well with good *Aqua-vitæ* into a Paste, and divide them into small pieces, bigger than grains of wheat, and then cast handfulls in at once into the water where is store of Fish, and you shall presently see the operation of the same.

#### RECEIT XXIV.

*How to make one Watching-candle, that it shall out-last three Watching-candles.*

**T**AKE a Pail, or Bucket, and fill it full of water, and set it in the place where you intend that your light shall stand: then take your Candle and warm it at the lower end, and there stick a brasse farthing token, or such like; and when you will light your Candle, put it gently down into the middle of the water, (but be sure that the bottom of the Candle do not touch the bottom of the Pail) and then it will swim upright to the very edge neer the light. The reason that the Candle will last so long, is caused by the coldness of the water; and this is a safe way that no Rat can run away with the Candle lighted, as I have heard that they have done, by endangering the house with fire.

RE

## RECEIT XXV.

*How to write any name or mark upon a Paper, and then burn it to ashes, yet afterward it may be read plainly.*

**T**AKE a new clean Pen that was never written withall, and dip in your own water as you doe in Ink; then strip up your Shirt-sleeve above your wrist, and upon your arm write your name, or any name, or any mark, and then let it dry on your skin, and nothing will be seen; then put down your sleeve and button your wrist. (Do this privately, and it will cause some to wonder :) then take a piece of white paper, and write your name, or the mark thereon, with another Pen of black Ink, (but let it be written as like the other as you can) then take the paper and burn it, and lay the ashes on a Table, and stripping up our sleeve, rub the ashes hard with your finger, where you had written with your water, then blow off the ashes, and the name or mark will plainly be read on your arm in black letters.

## RECEIT XXVI.

*How to see plainly any thing in a dark Room, in at a Doore or Window, standing a great distance off.*

**I**F there be never so dark a Room, with a Door or Window open; Take a Looking-glass in your hand, and hold it against the Sun, at a great distance from the Door or Window, and moving the Glass up

up and down, till the reflection of the Sun be upon your object, and then you may perfectly behold any thing in the Room, or see to read a Letter.

Some unhappy Boyes use to dazle peoples eyes with a Glasse in this order, as they walk the streets.

### RECEIT XXVII.

*How to view the back part of your head by Glasses.*

**I**F you would behold the back part or shadow of your Head (for a wound, or the like) take a Looking-glass, and hold it behind your Head, and then take another Looking-glass and hold it before you, and from the Glass behind, you may see your shadow in the Glass before you.

### RECEIT XXVIII.

*A pretty trick to tell, or name all spots or Court-Cards in the Pack, and yet never see them.*

**Y**OU must privately drop a drop of water or drink (about the bigness of a two-pence) on a table before you where you sit, and let any body shuffle the Pack of Cards, and then taking them into your hand, place a candle on the table before you, (for this trick is best to be done by Candle-light) and holding down your head (as you may see in the Figure) lift the Cards above the brim of your Hat, close to your head, that the light of the Candle may shine on the Cards; then in the drop of water (like a Looking-glass) you shall see every speck of each Card before you draw them, which you may name; or putting your finger upon the

the spots, you may say that you feel them out; then lay down your first Card, and name the next, as your first Card was the Deuce of Clubs, the next is the five of Spades, and so of the rest.



### RECEIT XXIX.

*How to keep or preserve any Fowl, Venison, or other pieces of Flesh, sound and sweet for three weeks, or a moneth together, although the weather be never so hot.*

**M**AKE a strong Brine with Bay Salt and white mingled together, so as the water be overglutted with Salt, and being scalding hot, parboyl therein the Fowl, or Flesh which you intend to keep for some reasonable time (that is to say, according to the greatnes and greasiness thereof,) then hang it up in a convenient cool place, and it will last a sufficient time, without any bad or over-saltish taste.

This is a good way for Sea-men, and others in hot countries, who are enforced sometimes to victual themselves in such intemperate climates, where no flesh will last.

last sweet four and twenty hours together, by reason that they have no means to make the same to take Salt, which without all question will enter this way, and make penetration very speedily, by reason of the hot and fiery spirit of Salt thus prepared.

### RECEIT XXX.

*How to make a speedy or present Drink that Travel-  
lers may brew for themselves, when they cannot  
relish their Beer or Ale at their Innes.*

**T**AKE a quart of good water, put therein five or six spoonfuls of good *Aqua-vite*, and an ounce of Sugar, with a branch of Rosemary, brew them a pretty while out of one pot into another, and then is your drink prepared.

### RECEIT XXXI.

*How to make on the suddain, good drink for Mariners,  
Souldiers, or for poor people, when Beer  
is scant, and Malt dear.*

**I**N time of extremity, these things following will serve to suffice nature (as hath been often proved.) Put a good quantity of wholsom fair water, a small portion or few drops of the Oyl of Sulphur, incorporating them well together, and it is ready.

*Another.*

One drop or two of the Oyl of Vitriol added to a good quantity of fair water, and well stirred together, it performeth the like.

Some

Some mingle Vinegar with good water, and it serveth very well to quench the thirst.

Others will carry a piece of Allom in their pocket if they are to travel, and know not how to get drink or water; and when they are a dry, they put a piece of that in their mouth, and it will fetch up moysture, which will assuage the thirst.

### RECEIT XXXII.

*A profitable way to harden Leather, that it shall outlast other Leather a long time.*

**T**His is a good and profitable Receit for many poor labouring men; and is thus performed, Take and lay such Leather as is well tanned to soak in water, wherein there hath been some store of filings of Iron, a long time, or else in the water that hath long lain under a Grinding-stone, into which such Iron as hath been from time to time ground away, and there settled.

This is good also to harden Leather for the Cawkers, or Pumps of Ships, or others, to make them last long.

### RECEIT XXXIII.

*An excellent Receit to make a dainty streight Walking-staffe to have knobs where you please.*

**G**Et a streight piece of wood (of your desired length) of Holly, Ash, Service-tree, Walnut-tree or Pear-tree, let it be free from knots, or shakes, then plan it into six or eight sides, a good deal bigger than your

your Staffe shall be; this being done, get a short Punch of Iron, and let the small end be filed about the bigness that you intend your knobs shall be filed about a bench or table, and where you will make the knobs with a hammer punch holes therein, and so do on every side, then plain it over again, till you have made your staffe smooth, that there be no dents seen thereon; when you have thus done, put it into some cauldron of boiling water for a good space, and when you take it out again, you shall see that it will be full of knobs, for with the heat of the water it forceth the bruises (which were made with the Punch) to swell out of the wood again.

You may file your Punch like a Starre, or other work, and it will shew very pretty; I once saw a Partizan, or Captains Leading-staffe, which was done in this manner, and being put into a Dyers Cauldron when he dyed blacks, and being dryed, and rubbed well with Linseed-oil, it shewed like Ebony.


#### RECEIT XXXIV.




*How to write Love-letters secretly, or From one Friend to another, that cannot be discovered.*

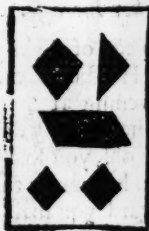
**T**AKE a sheet of white Paper, and double it in the middle, then cut holes through both the half-sheets, let the holes be cut like the panes of Glass-windows, or other forms what you best fancy, and then with a Pin prick two little holes at each end, and cut your Paper in two halves, give one half to your Friend (to whom you intend to write) the other half keep



keep to your self: Now when you do write, lay your cut paper on a half-sheet of writing Paper, and stick two Pins through the two holes that it stirre not, then through those holes that you did cut, write your minde to your Friend; when you have done, take off your Paper with the holes again, and then write some other idle words both before and after your lines, but if they were written to make some little sense, it would carry the less suspicion; then seal it up, and send it.

When your Friend hath received it, he must lay his cut paper on the same, putting Pins into the pin-holes, and then he can read nothing but your minde which you writ, for all the rest of the lines are covered, observe the Figure  fully apprehended.

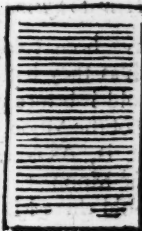
Where the Letter  doth signifie the half-sheet of cut paper with ; where the Letter B is placed, doth signifie the  of the Letter which you write, and where the Letter C is, doth signifie the Letter filled up with lines to joyn to the other words. Now when your Friend writes to you, he must doe the like.



A



B



C

And-

*Another.*

Write a Letter (what you please) on one side of Paper with common Ink, then turn your paper, and write on the other side with milk, (that which you would have secret) and let it dry; (but this must be written with a clean pen :) Now when you would read it, hold that side which is written with Ink to the fire, and the milky Letters will then shew blewish on the other side, which may be perfectly discerned.

# RECEIT XXXV.

*How to know when the Moon is just at the full,  
by a Glasse of water.*

**T**AKE an ordinary Drinking-glass, and fill it full of water up to the very brim, so that it doth not run over, let this be done a little before that the Moon be at full, and then at the very instant that the Moon is at the full, the water will presently boyl over.

# RECEIT XXXVI.

*How to know the Moons age at her Increase.*

**I**Have been told, that a thin piece of Cypress, such as they had wont to make Hat-bands of, if you hold it before your eyes in an evening at the increase of the Moon, you shall know how many dayes old she is, As when she is one day old, you shall see but one Moon, at two dayes old two Moons, at three dayes old three Moons; but afterward you shall see but one again.

RE-

RECEIT XXXVII.

*Another, shewing how to know both the Increase and Decrease of the Moon.*

**T**He Moon giveth such vertue to a stone which is found in *Arabia*, called *Selenite*, of which *Pliny* and others do write, that within the body of the stone the Moon sheweth her self, and increaseth and decreaseth according to the course of the Heaven.

*Another.*

Our common House-cats also have this property by the predomination that the Moon hath over them; that their Eye-browes do increase, or decrease each day, according to the course of the Moon, and her aspects; which thing is daily seen to him that pleaseth to note the experience thereof.

RECEIT XXXIX.

*A dainty way how to fetch Oyl, or Grease, out of Books, Writings, Papers, or Garments.*

**G**Oe to the Apothecaries or Grocers, and buy a penniworth or two of the Oyl of Turpentine, and put a drop or two upon the place which is Oily or Greasie, rubbing it on, and then you shall see how it will drink up the Oyl or Grease, and be presently dry and fair; for this Oyl of Turpentine is a great dryer, and is good to put amongst oyl colours, to make them dry speedily.

D

R E.

## RECEIT XXXIX.

*How to refresh and scoure old pictures that are wrought  
in Oyle, making them to look almost as fresh as  
if they were new done.*

**T**AKE the Picture out of the frame, then wipe, or brush off the dust very clean, and then lay it level upon a board, or table, pouring good sharp Vinegar all over the same, and there let it lye and soak for three or four hours; if the Vinegar be dried up, then pour on more, continually keeping it wet: then beat a piece of dry brick very fine to powder, (and see there be no lumps or stones therein, for they will raze and scratch the Picture) and then put the powder into a course linnen rag, and tie it, and then dip it well in a Porringer of Vinegar, and with your rag and powder, rub, and scour your Picture all over very hard, and then with fair water, or a wet clout, wash the filth away: But if you see any spots or filth remain, then scour it again, and wash it; then dry it very well with a cloath, and when you have dried it, put it again into the frame, and set it in the Sun for a day or two, (for the Sun refresheth the Colours very much) and then rub it hard with a dry woollen cloath till you make it shine, and then hang it up. This will cause it to look almost as fresh as when it was new.

Some use to wash them in Soap, and then Oyl or Varnish them over, but that is not good, because that the Oyl or Varnish will turn yellow, and gather dust.

RECEIT XL.

*How to keep Sword-blades, Halberts, Pistols, Knives  
Edge-tools, or other things free from rusting for  
seven years, or more, in a dry house.*

**T**AKE Fish Glew, or Ising-glass, and cut it in pieces, then with a Hammer, beat or bruise it upon an Anvile, or a stone, and then put it into a little skellet, or such like, with water, and let it dissolve over a gentle Fire, still stirring it as you do your common Glew; then when it is well boyled take it off, and with a Pensil, or small hair-brush, lay the same, while it is hot, all over your Sword-blade as thin as may be, and then lay it to dry, and it is done. This thin coat keepeth the moystnes of the Air from the Mettle, that it cannot rust; but when you are to wear it, or use it, take a blunt knife, and you may easily scale off the thin substance, and then it will be as bright as any silver.

I verily believe, that our common Glew will doe the like, keeping of it in a dry room.

RECEIT XLI.

*An excellent Cement for broken Glasses, China-dishes,  
or Cups, and such like.*

**T**AKE one part of Virgin-wax, and two parts of the tears, or cleer drops of Mastick, melt them together, and Cement therewith. But the better is, if you

D 2

beat

Beat the whitest Fish-glew or Ising-glass with a hammer till it begin to be clear, and then cut the same into very small and short pieces, and dissolve and melt the same over a gentle Fire with Aqua-vitæ; then let one that standeth by, hold both the pieces that are to be cemented over a chafing-dish of coals till they be warm, and during their heat, lay on the dissolved Glew with a fine Penilil, then bind the Glass with Wyre or Pack-thread, to keep it steady, and so let it remain till it be cold and dry.

*Another.*

Take a little quantity of unslack'd Lime, Wheat-flower, and the White of an Egge, and incorporate them together, Mastick, Aqua-vitæ, and white lead is good, so is Ising-glass, being dissolved and melted with Rhenish-wine.

## RECEIT XLII.

*How to grave Arms, Posies, or other devices upon Eggs, which may be served at a table.*

**M**ELT Suet pretty warm, and dip in your Eggs in this manner; hold the Egg between your thumb and your fore-finger, and quickly dip one half therein and hold it in your hand till it be cold, and then do in the other end that it be thinly covered all over; then take a little Bodkin or Needle, and grave in the same what Letters or Words you please, then lay the egg thus ingraven in good Wine-vinegar, or other vineg

in some stone Pot or Vessel for the space of six or eight hours, more, or less, according to the strength or sharpness of the same, then take out the Eggs, and in hot water dissolve the Suet from the Shells, then lay the Egge to cool, and the work will appear to be graven in the shell of a Russet colour. And if the Egge lye long enough in the Vinegar after it is so graven, the Letters or Works will appear upon the Egge it self being boyled, and so you may serve them up at the Table. And if you care not to lose the meat, you may pick out the same, when the shell is through graven, and you shall have a strange piece of work performed on the same.

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### RECEIT XLIII.

*How to make Wax, either red or green.*

**T**AKE to one pound of Wax in Summer, three ounces of the clearest Turpentine; but if you make it in Winter, take four ounces of Turpentine, melt these together over a soft fire, stirring them with a stick, and when they are well melted together, take it off and let it cool a little, and then mix with the same the red root of *Anchusa*, or Vermillion ground an ounce; and an ounce of sweet Oyl; stir these well together again over the fire, then take it off to cool, and pour it into cold water, and then upon a wet board, and your hands wet, you may roul it into what form you please. Instead of Vermillion, you may take three times as much Red-lead but that is not so good.

If you will make Green wax (instead of Vermilion) take the like quantity of Verdigrease.

# RECEIT XLIV.

*A pretty way how to cast off Flowers in wax, of divers colours.*

**C**Ause a Stick to be turned round at one end, (somewhat Taperwise) like the fashion of a Poking-stick, lesser, or bigger, (according to the bigness of the Flower you intend to cast) and at the smaller end thereof, with your knife, cut tents or nicks in the same, long-wise as you see here in the



Figure: The letter A. signifieth the Stick, the letter B. signifieth the Flower: Then take a little panikin, and in the same melt your Wax with a gentle fire, and when it is melted take it off, and then take your Stick (having a Porringer of fair water by you) & dip the end into the

water, and then shake off the water, or suck it off, and then dip the stick into the Wax, and sodainly pull it out again, dipping it into the water again to cool it, and then you may take off your Flower, and lay it by



by : and in this sort you may make as many as you please, For yellow Flowers, melt yellow Wax; for Red, red wax; for white, white wax; for green, green wax: Now for stalks for your Flowers, you may stick in a small wyre, or a Bent of a Reason-trail, or the like. You may have the coloured wax ready made at any of the Wax-chandlers.

## RECEIT XLV.

*How to make a Bunch of Grapes with Green Wax,  
that will seem to be naturall.*

**Y**OU must get a little stick turned round at the end, about the bigness of an Arrow; and then have your vessel of green wax melted, (as was shewn in the former Receit,) dipping your stick in the same about the third part of an inch deep, and it will be almost in the fashion of an Acorn-cup, make good many of them. Then take an Egge, and make a little hole in the bigger end of the shell, less than a penny, and get out the yolk thereof, and dry the shell, then with a piece of your green wax hold it to the fire, rub or daub the shell therewith thinly all over, then hold the shell in your left hand, and with your other hand take up first one cup, holding the same a little neer a candle to warm, and quickly tick it on your egge, and so do with all the rest of the cups, till you have filled it all over; they must be set something close together. Now when you have

D 4

thus

thus done, take a little stick, about the bigness of the tag of a point, and tye a pack-thread in the middle thereof, and then put the stick into the hole of the shell, and so hang it up: You may cut leaves like Vine leaves in green paper; and fasten them to the string or stalk above the bunch: I have made some womens teeth to water at this conceit, they seem so natural to the eye; and these Grapes will last all the year.

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### RECEIT XLVI.

*How to grave and In-lay Colours into Gold, Silver, Iron or Copper, to shew like Ammel.*

**F**irst, cover your Mettal with a crust of warm Wax, and when it is cold, with a fine sharp bodkin draw, or cut out the shape or proportion of what you please, either Letters, Flowers, Borders, or Scutchions, of a reasonable largeness: then pour upon the same empty places (which you have ingraven upon the wax) some few drops of strong water, or *Aqua-fortis*, and let them lye a while, and when you find them deep enough graven, mingle Orpment and Mastick melted together for a yellow colour, and Vermilion and Mastick for a red, and Bismuth and Mastick for a blew, and Ceruse for white, and Ivory burnt for a black. Now when your Mastick hath been melted with any of the aforesaid colour, let it cool, and then beat the same into powder, and lay the same powder within the graving, and after

lay the mettles upon a small Char-coal fire till the Mastick be melted, and it will remain fast and firm therein a long time.

## RECEIT XLVII.

*How to In-lay Boxes, Cabinets, or other things with hard Wax.*

**W**ith a Pen draw upon your Box any thing what best pleaseth your fancy, as Birds, Beasts, Flies, Flowers, Fruits, Leaves, Trayls, Anticks, Letters, &c. Then take a little knife ground sharp at the point, and cut or grave out the work pretty deep which you have drawn with your Pen upon the wood, when you have so done, lay upon the same some red or green hard wax, and with a hot Iron melt and rub hard the wax all over into the crevices, or works which you have cut out, and so let it cool: then take a knife and scrape away the wax to the board, and then you shall have your work which you drew to be in-laid very perfectly in the colour of your wax, as though it were drawn with a Pen, and will never wash nor wear off, when you have scrapt it clean, hold it a little to the fire, and it will fetch a gloss on the wax, and make it to shew the pleasanter.

RE-

## RECEIT XLVIII.

*How to harden the white of Eggs into an Artificial Gum, fit for many uses.*

**S**eparate the whites of Eggs clean from the yolks, and beat the Whites very well into a clear oyl, or water, and when it is settled, skim off the froath: then put the same into Bladders, and hang them in a chimney-corner, where fire is usually kept to dry, and in a few dayes the same will become as hard as Gum Arabick: in hot weather you may hang your Bladders in the Sun to dry: This Gum may be used instead of other Gums, and with it you may varnish Prints, or other things that are washed in colours.

## RECEIT XLIX.

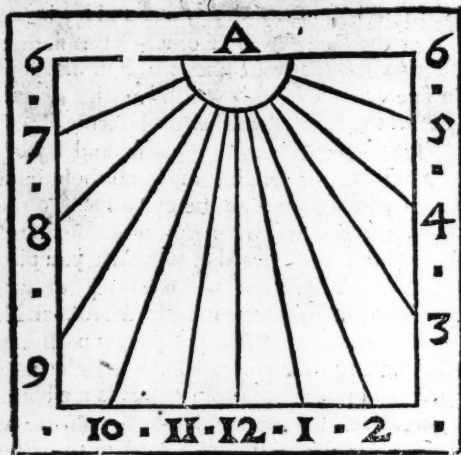
*How to make a true South Sun-dial, to be placed upright against a Wall, or on a Pole.*

**I**ntend not to speak of the multiplicity of Geometrical and Artificial forts, and making of Sun-dials, (of which many ingenious Artists have copiously written) a Mechanick way of two sorts, for the benefit of some who would be glad to know how the hours of the day pass away.

Take a piece of good writing Paper, and rub it over with Linseed-oyl, and hang it to dry in the Sun,

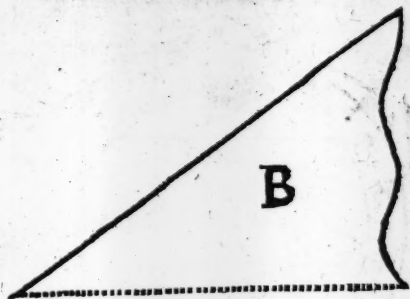
sun, when it is thorow dry, take and lay it over  
his print of the Dial (or some other of this nature)  
that you may see the hour lines through it, hold-  
ing of it safe from stirring, (which may be done by  
pinning it to the margent,) then at the center by the  
letter A. stick a Needle or pin upright, and laying a  
straight ruler close to the pin, draw all those hour-  
lines which you see through the oyled Paper; then  
take off your paper, and when you would mark out  
a Diall, do thus; get a board of what size you please  
that is smooth plained, and will not warp, drawing  
a streight line just down the middle thereof, and lay  
this paper thereon, and then put your pin through  
the center hole toward the top of the streight line on  
the board, and put another pin towards the bottom  
of the line, which is your 12 a clock line, (these two  
pins keep your paper steady;) then with a small  
bodkin prick a hole through every hour-line of  
your paper into the board, and then take it off; then  
stick in your pin into the center hole of the board  
again, and laying the ruler close to the pin, and close  
to each hole in the board, mark and draw your hour-  
lines; (and note that you may extend these hour-lines  
to what length you please, according to the bigness  
of the board;) and then figure it as you see in this  
example following.

Now



Now for the Cock or stile of your Diall, it must be set in the 12 hour line, and must be just equal in height from the board, as the triangular Figure marked with B. sheweth; the line with pricks is but to direct you which side must be next to the board: The Stile may be made of a thin Iron plate, and Cement in, or of a stiffe wire; the upper end of which must be put just to the center by A. equal to the 6 hour line, when this is done, you must get some Painter to paint it in Oyl-colours, and so set it up.

R E.

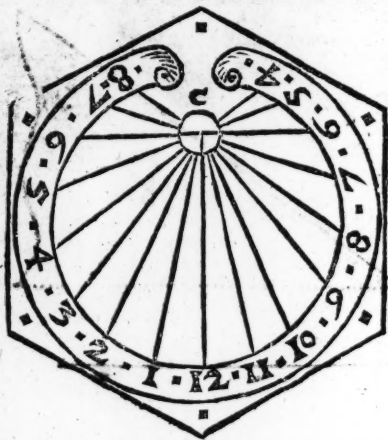


# RECEIT L.

*How to make a Horizontal or Flat Diall, to stand upon a Post, or other place.*

**T**His Diall may be made into sundry forms, either four-square, six, or eight square, or round as you please, and it is to be placed on the head of a Post, either in Garden, Yard, or at the out-side of a Glasse-window where the Sun cometh: behold the form.

You



You must note, that the hour-lines of this Dial doth vary from the former, and so doth the Stile in height : But you must work with this as in the other with your oyled paper, to draw the hour-lines, and to make a line just in the middle ; for your 12 a clock line. The center of this Dial is hard by the letter C. and must be more neer the middle than the other, because it containeth more hours thereon, for the other will serve but from 6 to 6, but this from 4 to 8. You may make this Dial in Stone, Wood, or Mettal, and remember to make the height of this Stile or Cock according to this triangle marked with the letter D. for it must be higher, as you may perceive by this

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this Figure: You may  
make Simmon for to  
fasten the stile; with  
cozen, powder of  
brick, and some chalk,  
mingled together, and  
with a hot Iron melt  
it into the cervise.

Note, That these  
Dials will not serve in  
any part of England,  
but within 10 or 20  
miles of London.

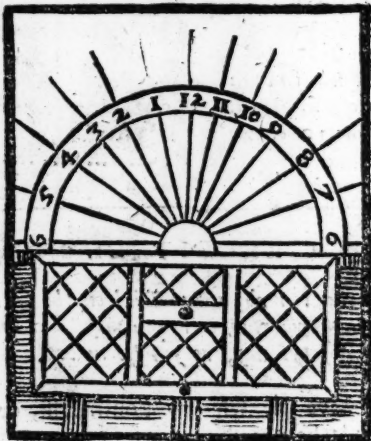


## RECEIT LI.

A pretty way to make a Sun-Dial on the Cieling of a  
room, or chamber, whereby you may know the time  
of the day, as you lye in bed.

IF you have any window South-East, or South,  
which is best, and that is for your turn, in the  
lower post, or frame of the in-side of your window,  
about the middle, fasten with wax a little round  
piece of Looking-glass, or other glass, about the  
bigness of a two-pence, ( you may cut it round with  
an old pair of Sizzers; ) but if you place it higher in  
your window on a ledge, it will be the better, (as you  
may see here in the Figure,) setting it level with the  
horizon; and the reflection of the Sun in the Glass  
will

will shew on the Cieling the hour of the day, the center of the Dial will be without the window and not perpendicular to the Glasse. This Dial may have no Stile, and it must be made like the last Horizontal Dial: You may draw the circle, hour-lines and figures with a penfil or coal, the black spot is the piece of Looking-glass, the Dial is the cieling.



### RECEIT LII.

*How to make a Candle-Dial, whereby you may know the hours of the night.*

**O**Ne Winters evening sitting by the fire, I thought there might be some device for a Candle-Dial; At length it came into my head, I made a little

little four square frame of wood, of a piece of a thin Trencher, making the in-side thereof fit for the bottom of a Candle-stick to stand in, which I did ordinarily use, on two sides of the square I fastened a little piece of Wyre, not a quarter of an inch long, and just where the Candle-stick should stand, on a Table or Boord, I made two little holes with a Bodkin for the ends of the two Wyres to goe into, and then I set down my Candle and Candle-stick into the square: Having thus done, I made another long Frame like the frame of a Picture, and pasted half a sheet of white paper therein upon a thin boord, and so hang'd it up against the wall; Then in the Ce-



ling I fastned a small Pulley, and on that Pulley I had two little plummets of lead one broader at the bottom then the other, and tied them to a piece of Packthread at each end, and so hung them in a Pulley, as you may better apprehend by the figure, the broadest Plummer I pulled down till it gave a shadow on the lower end of the paper in the

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the

the frame on the wall, ( which is now the 1 and 7, a clock line ) and where the broad bottom cast a shadow I made a speck with my pen, and then turned an hour-glass, and when that was run out, I made another speck, which is the 2 and 8 line, and so of the rest, by these divisions, you may with a pair of compasses divide the rest of the hour line upwards, you must pull down the broad Plummet and set it at any time to what hour you please, as by this, it shews that it is half and an hour past 4 or 10 of the clock. You must remember to have your candles alwayes of one size or weight, as of the eights, or twelves in the pound, or such as you usually burn. You may take away your Candle and candle-stick out of the square frame if you have occasion and then set it down in its place again, which keeps all right. I have placed the Figures at each end of the hour-lines, as from 1 to 7 on the first side, and then from 7 to 12 on the other side. Note when it is just 7 on the first side then pull down the Plummet to 7 on the other side, which I hold to be the best way,

### [RECEIT LIII.]

*How to keep Cherries, Peares, Nuts, or other Fruit a year as fresh as they came from the Tree.*

**W**Hen they are pretty ripe, cut off the stalks, and put them into an earthen pot well leaded, and then cover them well with Honey, then stop the pot

pot with Pitch, or Wax, that no ayre may enter in, and then put the pot in some Sellar, or cool place, burying it well in Sand; and so let it remain till you use it.

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### RECEIT LIV.

*How to make Grapes, and other Fruits to have no stone or kernels.*

**I**T is said, that if you do plant or set the smaller end of the twig of a vine some-what deep into the earth (which will take root) that those Grapes that will grow thereon shall have no stones, the like effect hath Peaches, Apricocks, Damsons, and other Stone-fruits, if the small ends of the cyons be grafted into the stocks. Also, if you bend down both the end of apple or pear-tree cyon, and graft them on both sides of the stock; and the next year when they have grown, cut the cyon in the middle, and one shall bear fruit with kernels, and the other none.

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### RECEIT LV.

*How to make yellow Roses grow, and to make Trees and other things grow green all the year.*

**I** Have been informed, that if you will graft a white Rose upon a Broom-stalk, or on a Furzon bush, that the same will bear yellow Roses, but they will have no sweet scent.

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Also

Also, if you will graft a Rose, or other thing upon a Holy-stock, the leaves of the same will grow green all the year.

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### RECEIT LVI.

*How to make Apples, Pears, and other Fruit of several colours, and to give them a dainty taste of Spices.*

**I**F you will give a pleasant colour to your Fruit, do thus; For a red, boyl Brasil, Turn-soyl or Sanders, and for a yellow, use Saffron, or Turmeric. Now to give them a dainty taste and smell, you must beat Cloves, Mace, Cinamon, and Nutmegs, to powder, and mixe them with the water of your colours with some honey; then with an augor bore a hole in the biggest part of the tree, unto the middle, something sloping down-wards, and then pour your water and spices into the hole, then with a pin made of the same Wood, or tree, beat it hard into the hole, and saw off the end, and wax it about; This must be done in Winter before the Spring, because when the sap riseth, the colour, scent, and taste also, ascendith with the same.

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### RECEIT LVII.

*How to know precisely on the Cieling of a Chamber, which way the wind blows at all times.*

**T**HIS conceit did I see in King James his Bed-chamber at White-hall, the Chamber was an upper room, having a Vane, or Weather-cock of Iron

Iron placed about the top, or tyles of the house which had a long stem of Iron, which did reach from thence through the Cieling of the Chamber, upon which Cieling was pointed a Mariners compass, with the two and thirty winds thereon, now the lower end of the stem of the vane came through the center of the compass, unto which was fastned an index or needle (like to those in an ordinary Dial) which doth presently shew how the various wind doth shift from place to place, which you may continually know precisely, both night and day.

# RECEIT LVIII.

*How to keep drink quick and fresh, that beginneth to be soore and dead.*

**I**T is good to put a handful or two of ground malt into your vessel (if it begin to fail) and stir the Drink and the malt well together, and this will make it to work a-fresh, and become good again, likewise if you add new strong drink to the old, the dead drink is forced for to work again to a new head. Some do bury their vessel of drink in the ground for four and twenty hours, and thereby recover it. Others do throw into the vessel a handful of Salt, it is also good to tilt your vessel before your drink be half out, and then it will draw fresh to the latter end. But the best way is to put a handful, or more, of Oat-meal into your vessel, when it is first laid into the Seller, or

Buttery, whereby it will alwayes carry a quick and lively taste.

## RECEIT LIX.

*An excellent way for baking of Bread, that it shall not be hard crusted, nor yield so many crums.*

**G**Oe to the Plate-worker, (such as maketh ordinary Dripping-pans) and cause him to make a Pot, or Pots of his Latten-plate, which may contain half a peck, or greater, or less, as you please, according as you mean the bigness of your Loaf shall be; let this pot be made with a bottom at the lower end, and open at the top, almost like a beaker, as you may see here by this Figure, and when it is done, take a little Butter, and annoint the in-side of the pot there-with, and when your Dow is moulded put it into the same, (not full to the top) and thrust it down hard to the bottom and then set it into an Oven amongst other bread, with the lesser end down-ward; and when it is baked it will easily come out this Loaf will have no hard crust, nor crume as other Loaves doe and will shew smooth, standing like a Sugar-loaf upon the Table, and in a little compass.





## RECEIT LX.

*A dainty, strong, and glistering Mortar, or Plastering  
for Cielings, or for Walls.*

**I**T is said that in *Italy* they much use this Conceit  
for Plastering of their Cielings, Floors, or Walls;  
which is by mixing and well tempering together  
Oxen and Cows bloud with fine Loom or Clay, and  
it will be a very strong and binding substance, and  
being well smoothed it will glister, and become  
very hard.

Some few (but choice) Physical Receipts, &c.

RECEIT LXII

*Of the great vertues of Crocum Martis, fit to be used at this time for the Bloody-flux, which so much now reigneth in the Army.*



His *Crocum Martis* is a powder which you may have at the Apothecaries, this amongst all other Medicines in the world, is the most excellent that can be found against the Bloody-flux giving it in this order. Take an ounce of conserve of Roses, and one scruple of *Crocum Martis*, and mixe them together, then let the Patient eat it in the morning, and fast thereon two houres, and this (by the Grace of God,) will help him, although he had it never so long, or never so sore. It is also given above all other medicines, in the latter end of a Drop-sie, and also against the Flux of Menstruus, and against bleeding at the Nose, and all other Fluxes whatsoever; it helpeth those that spit blood, it is excellent to stop the Flux in wounds, and to heal them, and dry them, if ye strew the powder thereon.

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## RECEIT LXII.

*Of the rare vertue and operation of the Quintessence of Honey, for many diseases, with the Oyl of Wax.*

**Y**OU must understand, that Honey is rather a liquour Divine, than Humane, because it falleth from Heaven, upon Hearbs and Flowers, and is such a sweet thing, that the like cannot be found upon the earth; this Quintessence is, of such vertue, that if any be almost dead, and drink two or three Drams thereof, he will presently recover. If you wash any wound therewith, or other soar, it will quickly heal. It is excellent against the Cough, Catarrh, or pain of the Milt, and many other Diseases, it helpeth the Falling-sickness, the Palsie, and preserveth the body from putrefaction.

The Oyl of Wax worketh in wounds most miraculously, healing them, be the same never so big and wide, (being before wide stitched up,) in the space of eleven or twelve dayes: but smaller wounds in three or four dayes, by anoynting the same therewith, and laying a cloath thereon wet in the same. Moreover, for inward Diseases it is excellent; It provoketh Urine which is stopped, it helpeth stitches, and pain in the loyns, if you drink one dram thereof in white Wine, it helpeth the cold Gout, or Sciatica, and all other griefs coming of cold.

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## RECEIT LXIII.

*Of the manifold operations of the Oyle of Cinamon.*

**T**his Oyle is of a miraculous nature, for it pierceth through the flesh and bones, being very hot and dry, and is good against all cold and moist diseases, being comfortable for the head and heart, working the same operation on a dying man as the former. To be short, this Oyle is of such operation and vertue, that if a man drink never so little, he shall feel it work to his fingers and toes ends, therefore it pierceth through the whole body, helping all Diseases that come of cold and flegmatick humours, it availeth much with Women in travell, it driveth away the Measles and spots, if the face and hands be anoynted therewith, it warmeth the breast, and helps the cold Cough, it consumes all cold Flux that proceed from brain and head, and causeth quiet sleep. In brief, this Oyl may be used instead of the natural Balm for many diseases.

## RECEIT LXIV.

*How to Distill, and make Oyl of Rosemary Flower, with its vertue.*

**T**ake Rosemary flowers and stamp them, put them into a glass with strong wine, stop it close, setting it in the Sun for five or six days.

and then distill it with a soft fire, and you shall have both water and oyl, which you must separate, keeping the Oyl close in the Glasse, whose vertues are these.

It helpeth against all pains in the Head, although they have continued seven years, it comforteth the memory, and also preserveth the eyes, if you drink now and then a drop or two, and put another into the eyes, it helpeth those that are deaf, if it be but into the ears, and also drunk with good wine, it openeth all stoppings of the Liver and Milt, and helpeth against the Dropsie, and yellow Jaundise, it breaketh wind, easeth Cholick, and rising of the Mother, it is also excellent against the Pestilence, or those which have drunk poyson, if they drink of this Oyl, and lay them down to sweat: It comforteth the heart, and cleanseth the blood, and maketh a man merry, and causeth a good colour: It helpeth those that have Canker and Fistula, and such like. And to be brief, it helpeth all the diseases of the body that come of cold and moist humours, although they were never so evil.

### RECIT LXV.

*How to help Deafness, and to expell wind from the Head.*

**T**AKE five or six drops, or more, of the Spirit of Wine, or good Aqua-vita in a spoon, and holding down your head on one side, let one pour the

the same into your ear, let it continue there about the space of half a quarter of an hour, still holding your head aside that it run not out, and then you shall hear a most terrible noyse and rumbling in your head, which is the wind, then turn your head aside and the water will run all out again very hot; Now when you have done thus much on one side, you may do as much on the other, but be sure to keep your head warm after you have done. **This I have often proved, and found ease thereby.**

### RECEIT LXVI.

*How to give ease, and help the raging pain of the teeth without drawing.*

**T**HIS is also performed with the spirit of Wine, and good Aqua-vite (as you have read in the former Receipt) by pouring it into the ears, especially on that side where your pain lieth: but after that you have let the water run forth of your ears, then with more of the same (water against the fire) you must rub and chafe your cheeks, and under your jaws, and behind your ears, stroking of them upwards with your hands toward the neck, to drive back the humours: for it is nothing else but a cold rheum that distilleth from the head into the gums which causes the pain: therefore be sure to keep the head very warm when you have done.

I have

I have been certified (but how true it is I know not) that three teeth taken out of a dead mans skull, and sowed in a clout, or piece of leather, and worn about them, which were much subject to the Tooth-ach, it gave them present ease, and they never were troubled with the same so long as they had those about them.

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RECEIT LXVII.

*A dainty Receipt for curious Artists, or others, to strengthen and comfort the eyes.*

This Receipt I had of a curious Ingraver, and my Friend, who every morning before he went to work, in the corner of his Hand-kerchief, (or a clean linen rag) did put a few drops of Aqua-vitæ, and with the same did wipe the corners of his eyes, eye-browes, and temples, which did keep back the Humour, and greatly did strengthen and comfort the eyes; of which I have often made triall, and found much comfort.

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RECEIT LXVIII.

*Fractures, which are bones broken, and also of Dislocations, or joynts displaced, with their cure.*

Any times it happeneth that Leggs, Arms, and Fingers are broken, or out of joynt, and the parts so hurt are void of help, by reason they have no Chirurgeon near them, therefore for the relief of such

such persons, I have here set down some direction by which they may be eased of their pain: But would not wish them to trust to too much of their own skill, if they have any expert Chirurgeon on hand to do it.

If a Legge, or an Arm be broken, then have care to place the member in the same manner as was before, which you shall do in this manner.

Take a towel, and make it fast above the place where it is broken, and then take another towel to fasten it underneath the place where it is broken, then cause two men to pull those two towels, so they may thereby extend, or stretch out the member, and when the member is stretched forth at length place the broken bones as they were at the first, so by little and little let them slack their pulling, then have a cloath ready, so bigg that it may compass the whole member, wet this cloath in white of Eggs, Oyl of Roses mingled together, and lay it on the grieved part, then roul it about with a linnen Rouler of four fingers broad, and two yards long, wet the rouler in water, and vinegar mingled together.

First, roul it about the fracture three or four times, then down-ward, and then upward, and fasten it, then roul it with another rouler, in the same manner, on these place thin splints of light wood armed well with towne, one fingers breadth from each other, and binde them on with tape, then place the member on some soft Pillow for twenty dayes, but if a painfull itch do arise, open and foment the place with warm water, and then anoynt it with *Unguentum Album*, and roul it up again.



If that a finger be broken, roul it with a convenient rouser, and splint it, and use the means aforesaid.

## RECEIT LXIX.

*A precious Salve for all those that have had any member out of joynt, called Jeremy of Brunswicks Salve.*

**T**HIS famous Chirurgeon, with this Salve, hath healed those that had formerly their members out of joynt, or those that had been wounded and could not stirr or bow the member where they had the hurt; for by this Salve did he bring many stiff and crooked joynts again to their former strength, to the great admiration of all men, both Chirurgeons and others.

### *How to make the Salve.*

Take two ounces of old Hogs-grease, and of Ducks-grease, and Goose-grease, Hens or Capons-grease, of each two ounces: Linseed-meal, Fenegreek-meal, of each two ounces, Oyl-olive eight ounces; Oppoponax, Mastick, and Frankincense, of each an ounce: dissolve the Gums in white wine (that are to be dissolved) and powder the other, mingle them all together, and adde wax and turpentine to them, then boyl them all together with good stirring.

R E.

## RECEIT LXX.

*How to order, and dress a Wound, when it is first hurt,  
with their remedy.*

**F**irst, remove all such things as are in the wound, as clotted blood, wood, iron, or the like, then dry the blood with a cloath or sponge, and wash it with cold white wine, and apply some unguents or Balmes to the same, and on that a plaister fit for a wound, then roll it gently, and in good form, for that helpeth to hasten the cure.

If the wound be of any length, you may stitch it in three or more places, but be sure for to leave a place at the lower part thereof, for to purge it self thereby.

## RECEIT LXXI.

*An excellent Unguent, or Liniment for green Wounds,  
especially for those in the head.*

**T**AKE of the best Turpentine an ounce and a half, and as much of Gum Elemi, of Capons-grease an ounce, melt these at the fire, and mingle them. When you use it, melt it, and annoynt the edges of the wound, and dip a pledge of lint in it, and then lay a plaister on the top of the same, and roll it gently.

RE.

## RECEIT LXXII.

*How to make a soveraign Oyl, or balm for all wounds  
simple or confused.*

**T**AKE three pound of common Oyl, two pound  
of Turpentine, wheat that is cleansed five ounces,  
Saint Johns wart a pound, Valerian, Cardus. Be-  
nedictus, of each fourteen ounces; bruise the Herbs  
and infuse them in white-wine six or eight houres,  
then put thereto the Wheat and Oyl, and boyl  
them on an easie fire; till the wine be consumed;  
then strain them, and put the Turpentine in, and  
then boyl them again on a soft fire to perfection.

## RECEIT LXXIII.

*An excellent Emplaster, which is good for all wounds  
or Ulcers.*

**T**AKE Deers suet four ounces, Rosin, and Per-  
rosin, of each a pound and a half, white wax,  
and Frankincense, of each four ounces, Mastick an  
ounce; melt the wax and suet, and powder the gums,  
and put them together, and when they be melted,  
strain them through a piece of Canvass, then add  
to them a pottle of white-wine, and boyl them all to  
the composition of the wine, with continual stirring,  
and then take it from the fire, and when it is almost  
F cold,

cold, put thereto four ounces of turpentine washed in white wine, and of camphire powdered two ounces; then make roulees of it, and keep it for your use.

## RECEIT LXXIV.

*Another excellent Plaister for Wounds in the Brest, or other parts.*

**T**AKE Rosin that is fresh, clear, and sweet, a pound, Oyl of Bayes, and turpentine, of each two ounces; Gum Elemmi sweet and good four ounces; melt the Rosin and Gum together, and stirr them well, then put in the Oyl and turpentine, and let it boyle with continual stirring, and then strain it, and reserve it for your use in a close pot.

When you use it, spread it on a piece of leather, bigger than the wound by three fingers breadth, and make a hole in the middle of the leather for the corruption to run forth, this doth it without tent or pledget: dress it twice a day in the Summer, and once a day in the winter.

This plaister is good for all wounds in the breast, or other parts, for it draweth the hollow parts of all wounds, and strengthneth the parts, clearing them from un-natural matter, and dryeth all wounds caused by thrusts,

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RECEIT LXXV.

*Of the general significations of sicknesses, either present,  
or near at hand.*

**T**He following Presages and tokens of sicknesses,  
are worth the observation of all men; First, to  
prepare themselves for God, if he be pleased to call  
them; otherwise that they may in time, before they  
may be too much spent, having the counsel and help  
of learned and expert Physicians.

*Signes of Sickness are these.*

If the body be hotter, colder, moyster, dryer,  
leaner, or fatter, or the colour more pale, or more  
swarthish, or the eyes more hollow than they were  
accustomed to be, and on the sudden change, all these  
are certain fore-runners and messengers, that the  
body is disposed to sickness, or already sick.

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RECEIT LXXVI.

*Of the signification of the severall colours of some Urines.*

**T**He Colours and Symptoms of urines are many  
and various, as are the Diseases, and therefore  
ought to be judged on by the learned: but thus  
much in brief.

Red and thick urine, betokeneth sanguine.

Red and thin, betokeneth melancholy.

White and thick, signifieth flegm.

White and thin, betokeneth melancholy.

The highness of the colour signifieth heat, but the pale, black, or green, betokeneth cold.

Also, the grossness, or thickness of the urine signifieth moisture, the clearness, or thinness, dryness.

Urine of the colour of bright Gold, or of the colour of Gilt, signifieth perfect digestion, or health.

Red as a red Apple, or Cherry, or base red like bole Armoniack, or red like glowing fire, betokeneth excess of digestion.

Clear and white like water, or gray as a horn, or white like whey, or the colour of a Camels hair, signifieth lack of digestion.

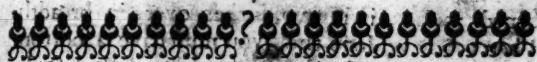
Pale, like to broth, or flesh sodden, betokeneth the beginning of digestion.

Citrine colour, or yellow, or sub-citrine, or paler, signifieth the middle of digestion.

Colour of a Beasts liver, or of dark wine, or green like to Cole-worts, sheweth aduersion of humours.

Urine of a leady colour, or black as inke, or black as horn, or dark above, and clear beneath, betokeneth feebleness of nature, mortification, and death.

The



# The School of Artificial Fire-Works.

## FIRST.

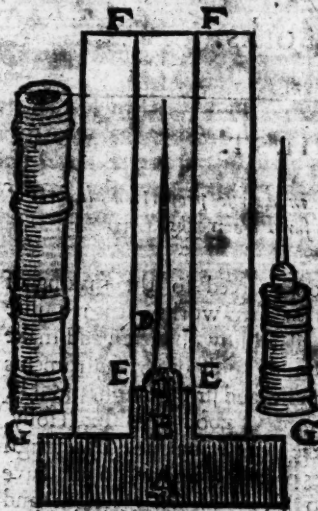
*The order and making in a true proportion all sorts of Moulds for Fire-works.*

**B**Efore you proceed to the making of Rockets for Fire-works, it is requisite to understand how to order, and make your Moulds and other instruments for the same, and first for your moulds. You must provide a piece of good dry Box, Holly, Walnut-tree, Crab-tree, or some such like tough wood, without shakes or knots, and when you have thus done it is fit to know of what length and breadth you desire to have your Mould, for following this kind of proportion, all other sorts of moulds are made great and small, therefore you ought to have a Turner to turn and bore the same: as for example: I would have the hole of a Mould bored but an inch diameter, or wide; then the length of the Mould must be six times so long as the hole is wide (which is six inches) and on each side of the hole half an inch thick: So that when the Mould is

F 3

turned

turned round, it is two inches over in breadth. When you have done this, you must have a bottom made, and is to be fitted in this manner, as is described by the letters in Figure following.



A. Is the foot of the Mould, and must be in height two inches, and must be in breadth an inch and a quarter, whether it be square or round.

B. Serveth only for a stay, and must arise one inch into the Mould, and so proportionable in all other moulds.

C. Is for the mouth of the Rocket, and is in breadth two third parts of an inch, and then setting one foot of a pair of Compasses

in the middle or center, describe the arch, which is the full height required.

D. Is the length and bigness of the Needle, which is two third parts the length of the mould, and the bigness of the bottom one sixth part the breadth of the bore, and taper toward the top.

E. E. Serveth for the Paper being rouled, and must be one sixth part of the breadth on each side.

F. F. Is

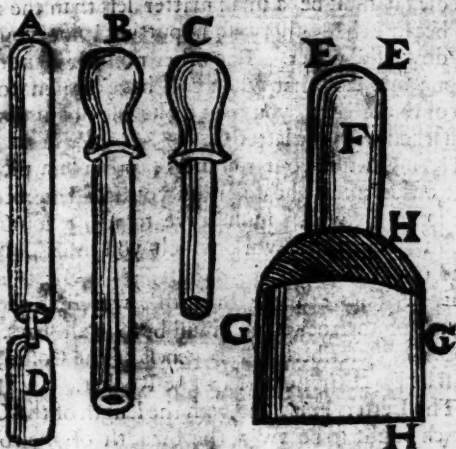


F. F. Is the thickness of the mould, which is half the breadth of the bore, that is in this mould half an inch.

F. G. Is the length of the mould, which is six times the breadth.

2. The order and making of Rowlers, Kammers, and other things for the Coffins.

Having provided your mould, then you are to fit your Rowler, which must be two third parts of the breadth of the bore of the mould, and the length thereof six inches longer than the mould, which is for rowling of your paper, and is described by the letter A in the figure following, with a hole to be



bored in the bottom to receive a Wyre, which must

be fastned in another piece of wood some what shorter, to take out at your pleasure, which is described by the letter D, the use thereof shall be described, when I shall shew the order of making the Coffins.

When you have fitted your rocket, then proceed to the making of your rammers, which must always be two at the least, for each several Mould as they increase in largeness, so you must be fitted with several rammers, by reason of the Taper Needle: the manner and form is described by the letters B, C, in the figure following.

B. Is the hollow rammer, and hath a hole in it answerable to the length and bigness of the Taper Needle, it must be a small matter less than the rowler, because that otherwise in putting it in, you will put down the pincer. The other rammer is not half so long, and sad, that when you have beaten to the top of the Needle, you may make use of this, which is marked with the letter C.

Having fitted your rammers, provide a piece of Box made after the form as you see described by the letter F, which must serve to make your large Coffins, to put the work which you intend, on the head of your rockets.

E. E. Sheweth the breadth, which is the just bigness of the rocket, and must be so in all sizes.

G. G. Describeth the largeness of the Coffin, and must be twice the breadth of the Rocket.

The Letters H. H. sheweth the length of the Coffin which ought to be twice the breadth of the rocket, but you are not tyed to that so pretisely, because

you

you may alter that according to the work which you put therein.

### 3 *How to order, and make the Coffins of Paper.*

**H**AVING explained the manner and form of the moulds, with the other things belonging to the same; I will now shew the use of them in their several orders: and first, for the use of the Rowler, described by the letter A. in the Figure before.

Provide you some good large strong Paper for your work: and to know what length your Paper must be, let it be alwayes the length of your mould, so shall you have one breadth left above the mould, the use whereof shall be shewed hereafter. Now having provided your Paper in length ready, take your rowler, and one length of Paper, and begin to roul; when you have rouled one sheet, you must have a board with a handle, to roul it with, (the board is marked in the Figure following with the letter B.) which must be done in this manner: You must hold the rowler in your left hand, and with your right hand hold the board by the handle, and then lay down your rowler upon some smooth chest, or table, which when you have done, roul another length of Paper, and so proceed in rousing between every sheet, untill you have rouled on so much, as will fill the mould very streight. When you have thus done, draw forth the rowler about an inch, and then take the other short rowler, which is marked with the letter D. in the other Figure, and put it in as you

see

see described, and there you shall have a place left for the choaking of the rocket, of which is next following.



4. *The order and manner how you shall choak a Rocket.*

**W**hen you are to choak a Rocket, you must have an Iron hook, or a staple driven into some post, to which you must fasten your cord, which must be bigger or less; according to the bigness of your Rocket, by reason that a small cord will not choak a great Rocket for want of strength, and a great cord will not serve for a small one; in regard that it will make too great a choaking, so that you must have a bigger and a less; and when you have so done, you must tye one end of the cord to the hook or staple, and at the other end, about a yard off, tye a strong stick, in fashion of a swing, it must

be strong, because it beareth the weight of the body, (as you may see in the Figure following, marked with the letter K) which when you have provided, put the stick between your leggs, and wind the cord about the Rocket-case in the place appointed, which must be between the long rowler and the short, when that is done, girt it by degrees, ever turning the rowler, to the end it may come together more close and neat, and when you have sufficiently choaked it, draw forth your short rowler, and where the choaking is, tye it about with strong Pack-thread, and then draw forth the rowler, your Coffin is ready to be filled when occasion serveth, the form whereof followeth, by this letter A.



S. The

5 *The manner of driving a Rocket, with the Instruments belonging thereto.*

**Y**Our Coffin of Paper being finished, take it, and with your hollow Rammer, force the same down close into the mould, and when you have done, strike two or three hard blowes to settle the Paper into his right form: Which being done, then you must fill the Coffin, in doing whereof you must have a care, providing a measure which may contain but the twentieth part of your whole Rocket, so by that means you shall not fail, but every Rocket shall have a true proportion alike: as for example; I have a Coffin, which being filled, will hold an ounce of mixture, or thereabouts: then I take the twentieth part, & when I find what quantity it is, I make a measure of horn or Latun marked with the Letter F. which shall contain so much, and then I begin to fill my Coffin with one measure at a time, and putting in my Rammer, I strike four or five smart blowes with a good heavy mallet, and then I fill another measure, and strike again, so I continue till I come to the top of the needle, then I take the said Rammer, and so continue with it, till I come to the top of the mould, now the paper which is above the top of the mould, must be turned down, and beaten hard: which being done, the rocket is finished from the mould, which being forced out with as much ease as you can, for the less you force it, (being filled, and the Needle taken out,) the better it is, for knocking loosens the Powder, and so causes the Rocket for to fail. You should have a Funnel to fill your small rockets, which is marked with the letter G.



6 Of the Composition and Receipts for your Rockets.

**H**AVING thus finished your Rockets, it now rests to know the Receipts: For in the making of them, the chiefeſt thing to be regarded is, the composition that they ought to be filled withal: forasmuch as that which is proper to Rockets which are of a less sort, is very improper to those which are of a greater size: for the Fire being lighted in a great Concave, which is filled with a quick composition, burns with great violence: and so contrary, a weak composition being placed into a small Concave maketh no effect: Therefore we shall here deliver Rules and directions, which may serve for the true composition, or matter wherewith you may charge any Rocket: from Rockets which are charged but with one ounce of powder, unto greater, which requireth for their charge ten pound of powder: And here followeth the ingredients for several Rockets.

First,

First, for Rockets of one ounce.

Unto each pound of good musket powder beaten, put two ounces of Small-coal dust, and with this charge the Roker.

For Rockets of two or three ounces.

Unto every four ounces and a half of powder-dust add an ounce of Salt-peter, or to every four ounces of powder-dust; add an ounce of Coal-dust.

For Rockets of four ounces.

Unto every pound of Powder-dust, add four ounces of Salt-peter, and an ounce of Coal-dust, but to have it more slow, unto every ten ounces of good powder-dust, add three ounces of Salt-peter, and three ounces of Coal-dust.

For Rockets of five or six ounces.

Unto every pound of Powder-dust, add three ounces and a half of Salt-peter, and two ounces and a half of Coal-dust, and an ounce of Sulphur, and an ounce of File-dust.

For Rockets of seven or eight ounces.

Unto every pound of Powder-dust, add four ounces of Salt-peter, and three ounces of Sulphur.

For Rockets of ten or twelve ounces.

Unto the former Ingredients, add half an ounce of Sulphur, and it will be sufficient.

For Rockets of fourteen, and fifteen ounces.

Unto every pound of powder-dust, add four ounces of Salt-peter, of Coal-dust two ounces and a quarter, of Sulphur and File-dust, an ounce and a quarter.

For Rockets of one pound.

Unto every pound of Powder-dust, add three ounces of Coal-dust, and an ounce of Sulphur.

For



For Rockets of two pound.

Unto every pound of Powder-dust, add nine ounces and a half of Salt-peter, of Coal-dust two ounces and a half, of File-dust one ounce and a half, and of Sulphur three quarters of an ounce.

For Rockets of three pound.

Unto every pound of Salt-peter, add six ounces of Coal-dust, and of Sulphur four ounces.

For Rockets of four, five, six, or seven pound.

Unto each pound of Salt-peter, add five ounces of Coal-dust, and of Sulphur two ounces and a half.

For Rockets, of eight, nine, or ten pound.

Unto every pound of Salt-peter, add five ounces and a half of Coal-dust, and of Sulphur two ounces and a half.

Here note, that in all great Rockets there is no powder put, because of the greatness of the Fire, which is lighted at once, which causeth too great a violence, and therefore ought to be filled with a more weak composition.

Now when you have provided your Powder, you must first meal it, and then searce it, so that it may be free from any corn, though never so small. Likewise take good dry coal, well burnt, and beat it to dust: searcing it very fine, which when you have done, mix them according as your occasion requireth, and follow your directions.

7 *The manner of heading a Rocket, with the order of capping it.*

**I**N the manner of heading a Rocket, you must use the thick Rowler, which you may see described by the letter F. in the second figure: upon which you must rowl some paper, or fine Paste-board, and past it so that it may be very close, and then choak it at the length of the thicker part, so that it may come close to your stick in the lesser part, which will be fit to be tyed to the top of the Rocket: so shall you have a Coffin to put in your works, which must be of divers sorts. This being done, you must provide taper Caps, which must be adjoynd to the top of the large Coffin: The use of them is to keep in your works, & to cause them to pierce the Air more twister. The manner of making these Caps, is to take a pair of Compasses, and describe a circle in a Past-board; then cut it out with a pair of Sheers, and that will make two caps, being cut in the middle, and turned one corner under the other, and so pasted: and let them so pasted, be put in a Napkin-press till they be dry, and when they are dry, cut out a half-circle in Paper, which shall fit round about the said cap, and shal serve to paste on the cap to the coffin; So you have all things ready to the finishing of your Rocket, which must be done in the manner which followeth. R. in the next Figure, is the crackers fastned to the top of the Rocket: S. is the cap, T. is the Fisgigs finished, H. is the stick tyed to the Rocket.

8 *The manner of fastning a Rocket.*

**H**AVING driven your Rocket, as I have shewed, with the Paper turned down, you must first prime it, which must be with cotten-wick made for that purpose, which you must put into the vent, leaving a piece to hang lower than the mouth of the Rocket by three or four inches; which being done, tie a piece of Paper over the mouth, that it may not fall out. Now having primed your Rocket, you may proceed to the heading of it, and that is done after this manner.

Take your Rocket, and on the head you should turn down the Paper, you must with a Bodkin pierce two or three holes, that when the Rocket hath spent it self, the works which are in the head may take fire; which holes prime with a little Powder-dust, and then put on the head, with the cloaking fitted to your Rocket, which must come over the same in such manner, that the bottom of the greatest part must come even with the top of the Rocket; which tie fast to the Rocket with thread, and then put in your works; but before you put in your works, whether they be Starrs, or any other workes, you must put in a little cottenwool, being rouled in Powder-dust, to make your Starrs to take fire, or likewise may blow out: Having thus done, put in your Starrs, or other workes, and if you make more than one tire, (as you may

G

do

do of your Stairs ) then you must put more Cotten  
rouled in Powder-dust among them, or between e-  
very fire, that they may all take fire; then take your  
Cap, and fill the hollow place with Cotten, because  
it is light, and likewise will fire quickly; which be-  
ing fitted, paste it close to the top of the Coffin,  
that it may stand upright; then must you fit your  
stick, for the poyling of your Rocket, which ought  
to be eight times the length of the Rocket without  
the head: You must get the smoothest and lightest  
you can, such as Basket-makers use, and then cut  
one side of it flat at the great end, then make two  
notches on the round side, that the one be differing  
from the other, so much as is between the choaking  
of your Rocket, and the end of the Vent, for if you  
should tye it upon the Vent it would loosen the Pow-  
der, causing it to break in the Firing: be careful  
that you tye not the wrong end of the Rocket upper-  
most, but tye that end downward that is choaked,  
and with a piece of thread that is strong, tye it to  
the lower notch about the choaking. When you have  
tyed that, then tye the other higher, and let the  
stick come even with the top of the Rocket, the man-  
ner whereof is shewed in the next figure, by the let-  
ter G. Then poyse your Rocket, by laying it on  
your finger two or three Inches from the mouth,  
and if you find the stick be too heavy, cut it shorter,  
till you find your rocket to ballance your stick, for  
if the stick be too heavy, the rocket will be a slug, and  
being too light, the rocket will fall before it be half  
up. These things being provided, you have your  
rocket ready to be fired, which must be after this  
manner following.

*The manner of firing Rockets, with the description  
of a Staffe for the same.*

**Y**OU must provide a long staffe, with a Pike at one end, to be thrust hard into the ground, with a three-legged staffe, having a hollow hoop at the top, to let this long staffe slide up and down, to the end that having Rockets, whose sticks are longer than the staffe, yet by raising it through the said Iron hoop, you may make it four or five foot longer than it would be, standing on the ground. Now this long staffe must have a sliding place cut with several points, which must be near the top; and at the bottom there must be a ring of Wyre, to let the stick goe through; which must be made likewise to slide up and down, so thrusting the small end through the said Ring, your rocket will rest upon that part above, which must be just opposite in a streight line; so open the mouth of your rocket, and pull out the end of your Cotten-wick, and with a piece of Match fastned in a Linstock, give fire to the wick, and by degrees you shall see it fire your Rocket; which ordered well, will mount very streight and high. Thus having shewed the whole order of composing a rocket, with firing of the same, I will in the next place shew you the order for making of starrs, and other workes, which are necessary for the heads of your rockets. The Figure of the rocket and the staffe are here presented.

The Letter G. is the rocket with the long stick,

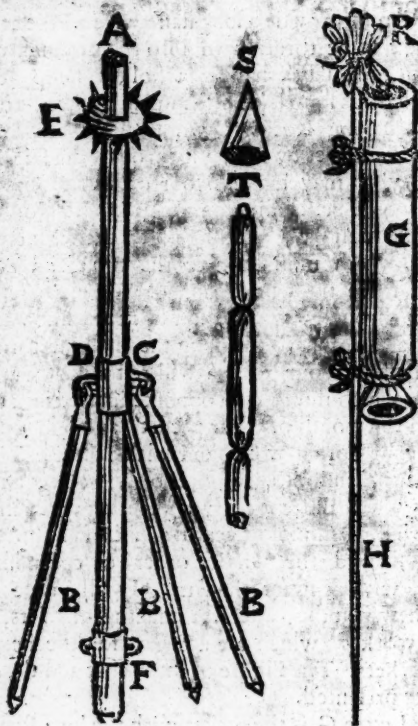
A. The long Staffe to rise through the ring.

G.

B. B. B.

B. B. B. The three-legged Staff.

C. The Ring or Hoop of Iron, for the long staff to slide through.



D. The Screw to fasten to the long staff being raised.

E. A

E. A piece of Iron filled with notches to hang the Rocket on.

F. The Ring of Wyre to put through the stick, to be raised higher or lower.

G. Is the Rocket.

H. The long stick.

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*10 Several compositions for the ordering of Starrs of  
several colours.*

If you will have your Starrs of a blew colour, with red, then take eight ounces of Powder meal, of Salt-peter four ounces, and of Sulphur vive twelve ounces: meal these very fine, and mixe them together with two ounces of Aqua vitæ, and half an ounce of the Oyl of Spike, and let it be dry before you use it.

If you will have a beautiful white Fire: take four ounces of Powder, twelve ounces of Salt-peter, six ounces of Sulphur vive, and half an ounce of Camphire: meal your ingredients, and mixe them. Now to powder your Camphire, you must use a Brasse mortar and a pestle, dipping it in Oyl of Almonds, so stirring it by degrees it will powder, and then keep it close from the Ayre till you use it, or the Camphire will lose its spirit.

If you will have a white Fire, and to last long, then take four ounces of Powder, one ounce of Salt-peter, eight ounces of Sulphur vive, one ounce of Camphire, and two ounces of Oyl of Peter:  
G 3 meal

meal those which are to be mealed very fine, and mixe them according to the former directions.

*II The order and manner of making the best sort of Stars.*

**H**AVING shewed the Compositions for Stars, now I will shew you how to make them, which is thus: You must make little square pieces of brown paper, which fill with your composition, and so double it down, rouling it till you make it somewhat round, about the bigness of a Nut, or bigger, according to the size of the Rocket, you may put in a dozen on the head of a small Rocket, binding them round with a thread, and then draw a cotten wick through them, being prepared for priming.

Also there is another way which is thus; take a small Rowler, about the bigness of an arrow, and roul a length of paper about it, and paste it round, letting it dry, and then you have a hollow trunk of this paper; fill this with your ingredients, thrusting it hard till it be at the top, and then cut it into short pieces, about half an inch long, and then in warm glew dip one of the ends therein, and let them drie, to the end that both ends of your Stars fire not, and then put the other end into Powder-dust; you may put them on your Rocket, in one or two tires, putting in Powder-dust between every tire, that they may all take fire.

The priming is thus made; Take Oyl of Camphire, soaking cotten wick therein, and being moyst

roul



and  
roul it in fine Powder-dust, and then hang it up  
till it be thorow dry, and then keep it close from  
ayre till you use it, or the spirit of the Camphire  
will decay.

12. The order and making of other several Fire-works  
for the Rocket, as Serpents, or Fissigs, Reports,  
Golden and Silver Rain, &c.

The Serpents or Fissigs are made about the big-  
ness of ones little finger, by rowling a paper  
upon a small rowler, (as it was for your Stars) and  
choaking the paper Comin an inch from the end, then  
fill it three inches with Powder-dust, and then choak  
it, and then put in a little corn powder, when  
your serpent have played a while to and fro, it may  
break and give a report: you may fill it with the  
Starr mixture, and putting divers of them on the  
head of the large Rocket, they will first appear like  
Starrs, and when the Starrs are spent, taking hold of  
the powder-dust, and they will run rigling to and  
fro like Serpents, and at last will give so many re-  
ports, very delightful to behold.

The reports are made in their proper cases as the  
Serpents are, but the paper must be somewhat thick-  
er, which will cause it to give the greater report.  
These are to be filled with grane powder, or half  
powder and Starr mixture.

To make the golden Raine, you must get store of  
Goose-quils and cut them off next the feathers, and  
fill these quils hard with the same composition that

is in your Rocket, and must be put on the head of the Rocket with the

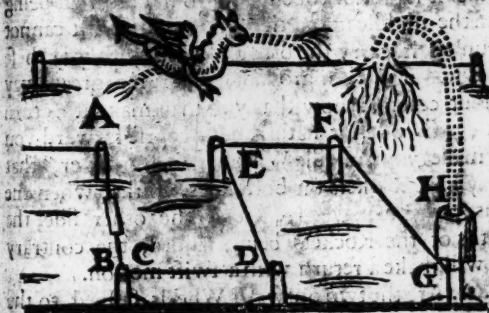
open end downwards: If it were possible to put a thousand of these quills upon the head of a Rocket, it were a dainty sight to see how pleasantly they spread themselves in the ayr, and come down like streams of gold, much like the falling down of Snow, especially if the wind be any thing high.

If you will make silver Rain it is performed as the other, only you must fill your quills with the same ingredients that you did your white Starrs.



13 How to make your fire-works to run upon a line backward and forward.

Take small Rockets, and place the tail of one to the head of the other, tying a Cane to them to run on a line soped; the line may be a hundred yards long, or longer if you please, being well stretched and set on stakes, as you may see in the figure following; as admit the Line to be ABCDEFG and if you give fire to the Rocket at A, it will fly to B, and then come back again to A, Then fire another to C, and that will fly to D, and back again



to C, and so of the rest: And at the last (if you please) may be placed a pot of Fire-works, which being fired will make good sport, having Serpents and other things in it, which will variously intermix themselves

themselves in the air, and upon the ground, and every one will extinguish it self with the report.

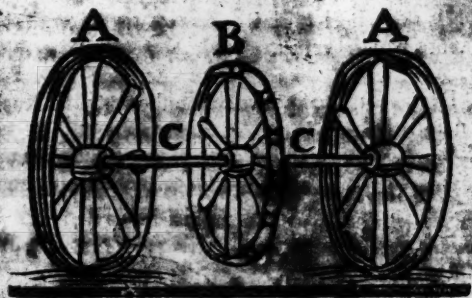
14. *How to make a Wheel of Fire make to run forward and backward upon the ground.*

**Y**ou must get a pair of light Wheels like spinning Wheels, both of a bigness, which must be fastned to a small light axell-tree, in such manner, that they may not move about the same, and on the middle of the axell-tree fasten also a Fire-wheel (as you may see in the Figure following) which must not be so big in compass as the two other wheels, because it must not touch the ground, so that being fast in the middle upon the same axell-tree, it cannot run unless it carry the other Wheels with it; these being set on an even ground, will run a great way without ceasing: now that you may make it return back again when it hath run its course forward you may make your middle Wheel in such manner, that it may have Rockets on both sides, so that when one side is spent, it may give fire to the other side, the mouths of the Rockets being fastned, the contrary way will make a return with a swift motion.

A. A. Are the two outward Wheels fastned to the axell-tree.

C. C. Is the axell-tree on which the three wheels are all fastned.

B. Is the Fire-wheel in the middle, and carrieth it not so great a compass as the other two wheels.



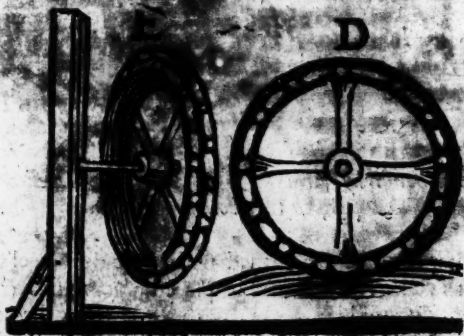
15 *Another way for a single Wheel to be placed on a post, to turn both ways.*

**T**his may be performed with a single wheel so that the Rockets may be placed on each side (as in the other middle wheel) with a hole from the one side to the other for a vent; then place your Rockets first upon one side (but so, that the last Rocket be placed over the said hole) and boring a small hole in one side of the last Rocket, put in a cotten wick for priming, letting it come through the hole in the Wheel, to the mouth of another Rocket which shall be turned the contrary way on the other side: so that the wheel having finished its revolution one way, may take fire on the other side making a retrograde

a retrograde motion: but if you place the Rockets all one way on both sides it will continue twice so long as another of the same bigness, the form of which is expressed in the Figures following.

D. Is the wheel with Rockets on one side, the last Rocket to have a vent to pass through to the other side.

E. Represents the said wheel finished, with Rockets on both sides.



16 The order to make a fixed wheel, standing upon a Post, giving divers reports.

There must be a wheel turned two foot wide, and out of the upper side must be a groove turned half an inch wide and half an inch deep, to which

which groof you must have a piece of wood so fitted, that it may just slide in, which piece of wood must have so many small holes bored in it as you will have reports about it, and be sure you set them not too near together, lest the fire of one beat the other down; having thus provided your wheel, you must make a conveyance, or hollow Trunk of paper, which will just fill it, and fill the same with some of your slow mixtures of starrs, and then putting on the cap of wood so fitted with holes, being made fast with glew, pierce every hole into your hollow conveyance so, that putting a quill into every one, they may take fire, and to the quill fasten a Report; so shall you have a peal of Chambers placed in a small room, which being once Fired, will follow in order, till the whole train be spent. Behold the Figure marked with A.



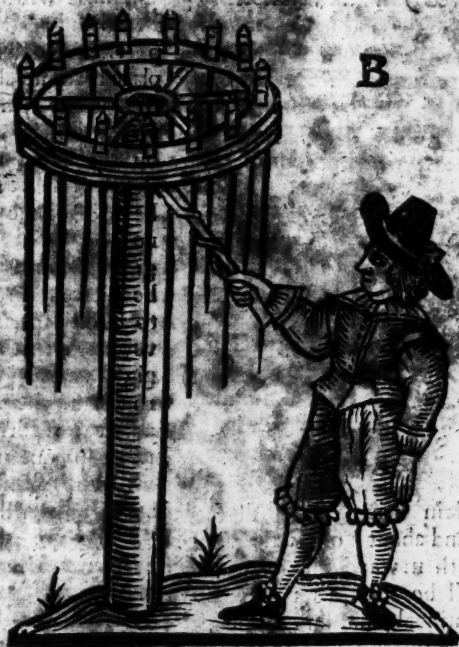
17 *Another fixed Wheel upon a post, which will cast forth many Rockets into the Air.*

**T**His Wheel is not much unlike the former, which will give Fire to divers Rockets standing circular, differing little from the former, only you must make a hole for every stick to pass thorow, as it is in the Figure B. and therefore it must be made somewhat broader, which will work the like effect that the other doth, by conveying Fire from one Rocket to another, till they be all spent.

The mixture for this conveyance must be very slow, therefore use these Ingredients: Take eight ounces of Roch peter, four ounces of Sulphur vive, half an ounce of Camphire, two ounces of Fine Powder-dust, and meal these very fine, and mingle them together, adding half a quarter of an ounce of Linseed Oyl and as much of the Oyl of Peter, these Oyles must be dropped in by degrees, and so wrought up, till you find your mixture bound like Dough, and this is both slow and sure.

18 *Another*





18 Another dainty fixed Wheel, which will cast forth  
divers Filigs, or Serpents, and as many Reports.

**Y**OU must have a Wheel turned with a groof on  
the top thereof to put in the conveyance of pa-  
per,

per, then fit on a piece of wood ( as it was before shewed ) with small holes to put in quills, which are



for firing your Reports, and must be placed round about the upper part of your wheel; and on the side thereof divers holes must be made of the bigness of your Figgis, which must be pierced through to the paper conveyance, those Figgis that are placed round on the side, and the reports on the top one train will fire them all,

and in firing you shall see all the Figgis flying round about, one after another as the fire passeth to them; and for every Figgis which passeth out, shall be fired a report; so that there shall be a continual motion, untill the whole train be consumed.

**G.** Is the Wheel with Reports and Figgis,

**R R.** Is the Reports on the upper part,

**F F.** Is the Figgis on the side of the Wheel,

### 19 Of Night Combatants with Faulchions and Targets, Clubs, Maces, &c.

**T**His is performed by two men seeming to fight, or to make way in a throng of people; the Clubs at the great ends are made like a round basket (or other form) with wicker, or small sticks on a staff, which must be filled with Rockets in a spiral form glued, and so placed that they Fire but one after another: The Faulchions are made of wood in a bowing manner having large backs to receive many Rockets, the head of one near the neck of another, glewed and fastned well together, so that one being spent, the other may take Fire: The Targets are made of thin boards, which are challened in spiral Lines, to contain Primers to fire the Rockets one after another, which is all covered over with a thin covering of wood or past-board, bored with holes spiral also, which Rockets must be glewed and made fast to the place of the channels: Now if two men having in each hand a Target and a Faulchion, or a Mace of Fire, and seem to fight, it will appear very pleasant to the Spectators; for by the motion of fighting, the place will seem to be full of streams of fire: And there may be adjoyned to each Target a Sun or burning Comet, with Launces of fire, which will make them more beautifull and resplendent in that action.



20 *Another dainty one with Fisgigs, called Jack  
in a Box.*

**T**He manner of making the same is in this orders  
cause a box of Plate to be made about six inches  
deep and of what compass you please (with a  
socket at the bottom to put in a staffe) then put-  
ting in a quantity of corn-powder, or powder du-  
in the bottom of the box, you may fill it with Fis-  
gigs or Serpents, leaving a place in the middle for a  
Cane to go through the bottom, which Cane must  
be filled with a slow receipt, in which you must put  
a quan-

a quantity of Camphir, but no Oyls, in regard of the narrow passage it hath to burn, without any other vent; then put your Cane down, leaving it an inch above the box, and take a thick piece of past-board, cutting a hole for the Cane to pass through, and glew it close to the Cane that the Fire pass not through before its time: this past-board must be of sufficient breadth to cover the box quite over, then put it on a staffe and light your Cane, which will appear only like a Candle, and after a little space of time you shall hear a sudden noyse, and see all those *Fisgigs* flying some one way, and some another: This hath given good content to the beholders, you may if you please make Clubs or Mases of the same.

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21 *Of Pots of Fire for the ground, which will make the Air rebound with their reports.*

**M**Any Pots being fired together, do give a fine representation and recreation to the spectators; for those pots being filled with balls of fire, or flying Serpents for the air, will so intermix one within another, in flying here and there a little above the ground, and giving such a volly of reports, that the air will rebound with the noyse, and the whole place be filled with sundry streams of pleasant fire; which Serpents will much trouble those neer the place to defend themselves in their upper parts; and they will be no less busied by the balls of fire which will seem to annoy their feet.



*22 The making of a Fire-ball for the ground, which will be in continual motion.*

**Y**OU must get a ball turned of some light wood, and then let it be sawen through the midst with a thin bow-saw, then make on each side a hollow groot to lay in two Rockets (joyned together after the manner of the Runners) and then close up your ball with glew; onely in the place where the two Rockets joyn shall be a groof, which must be pasted over with paper, that the second Rocket taking fire may have a vent, otherwise the ball will serve but once, then fire it, and you shall see the operation with pleasure.

23 *The making of a Ball for water which shall burn  
with great violence.*

**S**OW a round Case of strong Canvas, in shape of the case for a Foot-ball, but somewhat lesser, and very round; having thus made your case, then proceed to the filling of it, which must be done in this manner: You must first put in three or four good Spoonfuls of your mixture following, and with a stick made round at one end, force it close together, and so continue filling it, and between every filling put in your stick, and force it together, round it continually in your hand, till you have finished it; which having done, sew it up close, and then arm it with small cord, which is called marling; after you have thus done, you must coat it with a quantity of Rosin, Pitch and Tallow to dissolve, and dip your ball all over in the same, provided that you leave two vents to fire it, which must be pierced a third part into your ball, which must be stopped with two small sticks, till such time that you come to use them, the form thereof you shall see in the next figure by the Letter D. then pulling forth the sticks, fill the two vents with fine powder-dust, and firing it, cast it into the water, and you shall have your desire; but you must alwayes be sure that your ball be thoroughly fired before you cast it from you: The Receipt for this ball followeth.

Take one pound of Powder, eight ounces of

H 3

Roch-

Roch-water, four ounces of Sulphur, two ounces of Camphir, one ounce of oyl of Peter, one ounce of Linseed Oyl, half an ounce of Oyl of Spike, and two ounces of Colophonia.

24 *Another, dainty Water-ball, which will shoot forth many Reports.*

**T**His Ball must be made of wood (as was shewed before) in two pieces, because you may joyn it close together at pleasure, having small holes bored round about it, to put in your quills which justify the Reports, which reports or breakers must be made of paper, choaked at both ends, and primed through the midst; they must be fastened round with pitch, and so covered round about, that no water may pass in: you must fill this ball in two halves, that you may force it very close together, and when it's filled, glew it fast, and arm it well with nealed wyer, then put in your breakers, with a quill which must enter into the ball, and likewise into the breaker; the form whereof you may see in the Figure following: For A. is the mouth of the ball where it is to be fired, B. B. are the reports or breakers, being made of paper, and filled with Corn-powder: C. C. are the Quills, which must be filled with powder-dust, and serveth for firing the Reports.

The





The Receipt for this ball are these; Take one pound of Roch-peter, four ounces of powder-dust, three ounces of Sulphur-vive, two ounces of Camphir, one ounce of Linseed-oyl, two ounces of Rosin, and one ounce of Oyl benedict, you must powder those things which are to be powdred, and mingle them altogether, and by little and little sprinkle your Oyls, till you have wrought it like Palle, and then use it: the quills must be filled only with powder-dust, because it must fire suddenly.

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25 *How to make a Dragon, or the like, to run on the Line, spitting of fire.*

**T**He body of the Dragon must be made either with Past-board, or with fine rods of wicker, being hollow, with a place in the belly to put in two Rockets, and must be so ordered, that there

H 4

may

may come a small Pipe from the tayl of one, to the head of the other : then make a place for the eyes and mouth, to put into each hole fire, which must be made up in rouled Paper, and thrust in, then on the top of the back, let there be fastned two small Pullies for a Line to run in, which being done, your Dragon is finished for firing, which must be thus : first set it at the eyes and mouth : (always observing that this receipt must be some flow mixture, such as your stars) then fire that Rocket which is placed with his mouth toward the tayl of the Dragon, which will make it seem to cast fire from thence till he come to the end of his motion ; and then on a sudden (as a creature wounded with some accident) shall return with fire coming forth of his belly : This being well ordered, will give good content to the beholders of the same : Behold the Figure.



26 *The manner and form to represent Saint George fighting with a Dragon in Fire, on the Line.*

**W**Hen you have formed your Figures of Past-board, or Wicker ( as aforesaid ) you must make a hollow trunk through the body of each Figure, for a great Line to pass through, and likewise for a smaller Line to draw them to and from each other, which must be fastned in this manner ( as you may see in the Figure following : ) At the breast of the Dragon let one end of one cord be tied, which must pass through the body of the George, and turning it about a Pulley at the other end, fasten it to the back of the George, and at the breast of the George let another cord be tyed, which must pass through the body of the Dragon ( or a trunk on the back ) and so returning about a Pulley at that end, must be pulled streight and fastned to the tayl of the Dragon, so that as you turn that Wheel, the George and Dragon will run furiously at each other : and when you please, you may cause them to make a retreat, and come on again : but by all means forget not to sope your line extraordinary well, and likewise have a care that your work be not too heavy above line, but that they may hang in an equal ballance, otherwise they will turn their heels upward which would be a great disgrace to the work and Work-man : And thus much to the ingenuous I suppose will suffice : behold the Figure.

27 *How*



27 *How to make a Whale, a Mermaid, or other to play and swim upon the water.*

**Y**OU may make Figures of what shape your fancy best pleaseth: the body must be made of light wicker rods, and in the midst of the body let there be placed an axel-tree, having two Wheels coming into the water, yet so as they may not be seen: these Wheels must be made hollow, to contain a quantity of sand or water: the use of it is to keep the body of your Figure upright, and able to sink it so far into the water as is needfull, and likewise to make it to swim more steady: note that these Wheels must be loose, and the axel-tree fast: in the midst of this axel-tree, place three or four great Rockets one by another, with their mouths all one way: yet so provided that there may be such a distance between each Rocket, that there may come a vent from the tayl of the first to the mouth of the second, and from the second to the third. And to the end that it may continue the longer in motion, you may place divers lights about the  
body

Body, to make it the more beautiful; every of which lights extinguishing shall give a report, and so conclude. There are divers other fine Works to be performed on the waters, which a judicious Artist may invent.

The Letter B. represents the Mermaid.

C. is the Wheels on the axel-tree.

D. are the Rockets on the axel-tree.



28 Of, divers other rare Works, which are to be performed on the water.

**T**Hose places which are situated upon Rivers or great Ponds, are proper to make these recreative Fires

Fires on; therefore if you desire to make some consequence, they ought to be built upon Boats, or light timber, which may be framed like Beasts, or Fishes spitting fire; upon which may be built Castles, Pageants, Turrets, or other conceits as you please. As if you would present a Castle, out of which shall issue a Dragon, which shall swim through the water, and that Dragon be encountred by a horseman, which is thus performed. Cause a Cattle to be framed (as is shewed) on light timber, and let the bottom of the door of the Castle with a ground plat be two foot under the brim of the water, (the reasons follow) and at a foot high within the Castle let there be a certain linetyed, which may pass through the body of the Dragon, and may be fastened near the shoar, where must be a float sunk so farr under water, that the line may not be perceived; then fasten on your Dragon, (as was shewed before for the line) but so, that the head of this may alwayes be above the line, whereas the other was under, then at the appointed time, there must be one ready within the Castle, to fire those parts of the Dragon which is requisite; which being done (by the help of the pulleys) shall pass it through the water, which so soon as it presents it self, *Neptune* on a Sea-horse shall come, and encounter the said Dragon, and at last shall overcome it: Or you may order the work so, that which you please shall have the victory; for that which keepeth fire longest, is supposed to have the best, and that which is soonest spent, to have the worst.

G. representeth the Castle floating on the water, from whence issueth the Dragon.

E. is

E. is the Dragon coming forth of the Castle.

D. is Neptune riding on the Sea-horse, coming to encounter the Dragon.

F. is the Pully that causeth these motions by the Line, to be pulled to and fro.



You may if you please, build upon Boats, or Timber, Turrets, Pageants, or Castles, as is said, to receive or hold diversity of Fire-works that may be made within them, which may play out, and play divers Fires, as Reports, Stars, Golden Rain, Fisgigs, Granadoes, and Balls of Fire to burn in the water, which will give great content to the eyes of the beholders; and in the conclusion, it may be so ordered, that they may fire one another, for which end they were made.

29 *The manner to compose a Ship of Fire-works, which being once fired, divers motions will present themselves.*

**Y**OU must make a mould or body of a Ship to be made, that you may take off the upper deck, to place some works underneath, where you must have a fire-wheel placed with a screw on the Axel-tree; this Wheel must be placed in the stern, and must turn a rouser, on which must be two girts placed, that must pass on each side of the main mast, and run on to the foreship; in this Wheel there must be a hollow spoke and axel-tree, as I have shewed, which must be so ordered, that the Wheel being spent, it may convey fire to a tire of Guns, lying round about, which must be fired with a close conveyance; and having passed that, it must take hold of another conveyance, which shall give fire to certain Rockets, which must be placed in the bodies of some figures representing mariners, and must be so fitted, that they may have a Cane joyned to their body to guide them, that they may run on the ropes from the Deck to the top of the masts. This and other the like may be performed with great facility; the form of which followeth.

B. The Fire-wheel which moveth the Rouser, and carrieth the girt whereon the Figures are placed.

C. The Figures placed on the girt being in motion.

E. E. The Figures which stand ready to run up the cords, some half way, some at top.



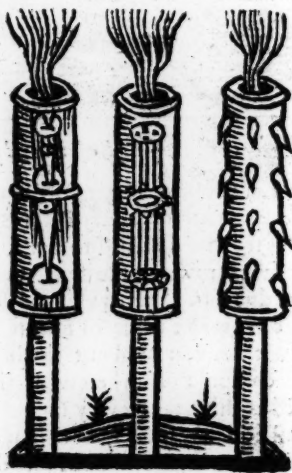


30 *Of Launces of Fire for pleasure and for service.*

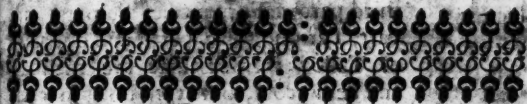
**S**Tanding Launces are commonly made with hollow wood, to contain sundry Petards or Rockets; these Launces may be fastened to posts, so that they may not be overthrown in the flying out of the Rockets or Petards: but there are a lesser sort of Launces, whose cases are of three or four foldings of paper, of a foot long, and about the bigness of ones finger: the composition wherewith these Launces must be filled is this; unto every four ounces of powder you must add two ounces of Salt-peter, and unto that add one ounce of Sulphur; and then it will make a brick fire red colour before it be half spent, if the

the Launce be fired and held to it : Now if twenty such Launces were placed about a great Rocket, and shot to a house or ship, it would produce a mischievous effect.

Or, if unto the end of the Rocket there were fastned an arrow (which must not be too heavy) and instead of the feathers, it should be of thin white tin plate, and if you give fire to it being thus prepared, you may see how serviceable it will prove. To the head of such Rockets may be placed Petards, balls of Fire, Granadoes, and the like, and so may be applied to warlike affairs.



Here



Here followeth Necessary and  
Serviceable Fire-works both for  
Land and Sea Execution, and  
first for the Pike.

**H**AVING treated of Recreative Fire-works, I hold it convenient to speak something in brief concerning works for Service (necessary for these times) both for Land and Sea; which may thus be performed.

If you would make good a Breach, or enter a Ship, then take strong Canvas, being cut, sewed, and tyed hard on a Pike with Marlin-cord, then with this Receipt following, being compounded and wrought together, do thus.

Take Roch-water one part, and Peter in meal as much, Sulphur mealed two parts, three parts of Rosen in roch, Turpentine one part, as much of Linseed-Oyl, one half part of Verdegrease, Bole-armoniack, Bay-salt, Colophonia; of these three one third part, and if you think fitting, half a part of Arsnick: Then coat the same over with this liquid mixture melted in a pan or pot: Take four parts  
I of



of Pitch, one part of Linseed-oyl, one third part of Turpentine, Sulphur one part, Tar one third part, and one part of Tallow : After these are melted, and being cold, bore two holes in each of the same an inch deep with a sharp Bodkin or Iron, filling the same with fine bruised Powder, and put in each hole a little stick of two or three inches long, to be taken out when you would fire the same : (This composition will burn furiously.) If you please, you may fasten to the same receipt on your Pike, divers light Pipes or Canes of Iron, or Brass of six or seven inches long, being Pistoll or Caliver bore, (as the Figure marked with B. sheweth) placing the touch-hole thereof close to the Canvas, boring the said Canvas through, and priming the same with fine powder, passing a Paper thereon, and then coat the same over as before said ; This being charged with powder and bullet, will do great execution in a throng, either defensive or offensive.

How

*How to arm a Dart or Javelin with Wild-fire, for the  
Sails or sides of Ships.*

**Y**OU may arm a Dart, Javelin, Partizan, or such like weapon, to do excellent service, being in the hand of a valiant Souldier, as you may see by the Letter C. in the same: The same should be filled with the self like Receipt, as before is shewed; for the Pikes with Wild-fire, which will be a very good weapon for to go into the sides or sails of Ships.

Or you may place upon the staffe of your Javelin certain Pistol barrels of one length, about ten or twelve inches, letting the same into the wood round about the staffe a little, as a Pistoll-barrel is into the stock (as the Figure marked with the letter D. sheweth,) which staffe should have so much substance at the one end, whereto you may nail the same barrels fast at the britch; and about the midst of the same put over a hoop of Iron, as close as ever you can, the which is to be charged in this manner following: *viz.* First, charge every barrel with two inches of powder, after put in a bullet a little lower than the bore of the same piece; then take of this slow Receipt following.

Of bruised Powder four parts, Salt-peter in meal, Linseed Oyl, Brimstone finely beaten, Varnish, and of Willow or hazel cole moistned with a little Vinegar: (of all these five last Ingredients one Part;) which must be well wrought together with the hand in some wooden Vessel, till you feel that

it will cling together, of which you must put in after the bullet two inches, and thrust the same together with a Rammer stick; and then again put in two inches of powder, and after that a bullet, and lastly, two inches of this slow Receipt, untill you have filled every one of the said Barrels within half an inch of the mouth, the which is to be filled up with the said slow Receipt, and powder bruised and mixed together, that it may the sooner fire: This being done, bind a paper over the mouths of the same, untill you will use them; and giving fire to any one of the same, it will fire all the other, and every one will discharge three or four shots a-piece one after another, to the hurt of the enemy, being used in service either to offend or defend; to the pleasure of the beholders, being used in triumph with bullets of Receipt rolled in tow, and coated with brimstone.



*How*

*How to enter up a pair of stairs, or to defend ones self, being in a narrow Room.*

**I**F you are streightned up in a narrow Room, to defend your self, or would enter up a pair of stairs, where you cannot use a long weapon, you may make a Logget, whose staffe shall be but three or four foot long, arming the same with the same Receipt as was shewed to arm the pikes, whereon you may place certain pipes of Brass or Iron, charged as before is taught: And if you please, you may put into the end of the staffe, a Rapier blade, with a skrew, to take off and on at your pleasure, as the Figure marked with the Letter E. sheweth.



*How to defend a Breach, a Ship, or other place of defence.*

**T**O perform this, you may arm a Partezan Javelin, or Fork with Firework, and to shoot every

every one of them with seven or eight pistoll or musket bullets in nailing a plate of Iron cross the pike or point of the said Javelin, or between the grains of the fork, piercing certain holes through the same, unto which with a strong wyer, you may make fast on either side so many pipes of Iron, of



seven or eight inches long, as you think convenient to fix upon either, or any of the said weapons, and charging the same with powder, bullet, and wad, you may cause the same to fire one after another, in filling a role of Canvas sewed together, (as the figure F. sheweth,) with slow Receipt, and coated, as before is shewed: And this being placed ar-

tificially upon the short barrels or pipes (as the Figure H. sheweth) and primed with fine powder directly against the Touch-holes of the barrels, passing a little paper over the same, firing the said trains at both the ends, which as they burn, shall still discharge the short pieces one after another, to the great hurt of the Adversary.

T  
How



*How to shoot Arrows of Wild-fire out of a  
Cross-bow.*

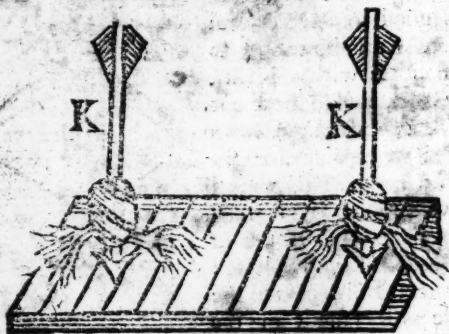
**T**His is an excellent way to fire the Sails of Ships, thatched Houses, Stacks of corn, or Hey, or any such combustible matter apt to burn, which may be done at a pretty distance off, when you cannot conveniently come near the same: Therefore it is good to have certain strong Cross-bowes, to bend either with a Rack, or Gessel, and to shoot out of the same strong Arrows armed with Wild-fire, and headed as the Figure I shewed: or you may shoot these Arrows out of a Musket if you please: The composition is to be made as is taught in the arming of pikes with Fire-works, which Arrows may do great good for divers other services.



*How*

*How to burn Wooden Bridges, Gates,  
Houses, &c,*

To perform this and the like military Services,  
if you can come to annoint the same with  
some such liquid composition as is before shewed  
for the coating of Fire-works, melting in the same  
a good quantity of bruised brimstone, and stick-  
ing in the same arrows of Wild-fire, made in pro-



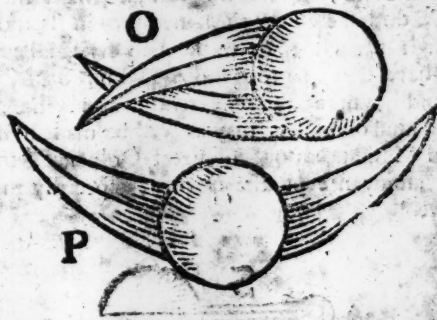
portion, as the Figure K doth shew. The Receipts  
may be made as the former for Pikes, with Wild-  
fire, which will certainly set the same on fire, for  
the Receipt is so forcible that it will burn in the  
water.

an H

How

*How to cut the Cables, or the Shrouds of Ships,  
at a good distance.*

**F**OR Sea-service there is devised out of great Ordnance to shoot certain Bullets that shall open and shut with a joynt in the head like a pair of Compasses, the arms or legs whereof are made in proportion like to the blade of a knife, taper-wise, and bowing sharp towards the point; as the Figure sheweth marked with the Letter O, and how the same is to be put into the Peece after the powder



and Wad; and the other figure marked with the Letter P, doth shew how the same being in its violent motion, flyeth open through the Aire like a Sicke, cutting the Cables, Shrowds, or any thing in its way, being shot out of any peece of great Ordnance.

*Other*

*Other Devices for the cutting of Shrouds, or the like.*

**F**OR to cut the Tackle or Shrouds of ships, it is good to cast half bullets of Iron, or lead, unto every of which make fast a barr of Iron, wrought either three or four square, about the bigness of a mans finger, and cut some fourteen or sixteen inches long, with a loop at the end; unto which a Ring of Iron is to be put, that the same may close and shut, as the figure with the letter S, sheweth: which sheweth also how you must put the same into the Piece; and the other figure with the letter T, doth shew how the same flyeth in its moving through the ayr: or to the said half bullets you may have barrs in proportion of a knife blade, with a round joynt at the end to open and shut, the which kind of bullets may as well be made to shoot out of Muskets, as out of great Ordnance, to the great annoyance of the Enemy, especially in Sea Service.

*Another*

*Another for the same.*

**A**lso to cut the Tackle of Ships, or to do many other good services, either with musket or great Ordnance, it is good to chain two bullets together, in the figure Y. sheweth.

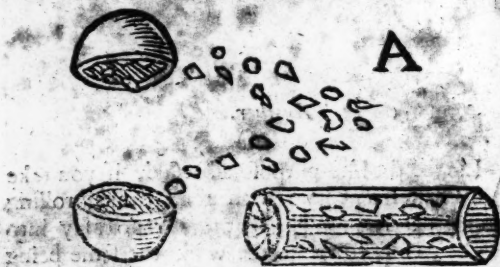
*Another.*

**A**lso for the like purpose aforesaid, if you take a small Iron Chain with good Links, rolling the same together round, that it may go easily into the Piece, close down to the wad, the same being again discharged, will spread it self in length and do good execution.

*How to do excellent Service against an enemy who would enter a Breach, a Gate, a Bridge, a Ship, &c.*

**I**f that the Enemy will enter (and that you intend not to yield) it is necessary to have in readiness

diness divers hollow bullets made of two plates of iron, or other mettall, so that the one may close about the other round like a box, which being filled with pebble stones, square pieces of iron, called Dice-shot, musket bullets or the like, which being discharged out of a murdering Peece, it will do great execution: if you will fill cases of wood, made like unto a Lanthorn with the same stuff, it will perform the like service being shot out of a Murdering peece: Behold both the figures marked with the letter A.



*How to prevent a train of Powder laid to blow you up, before you enter a Ship, or other place.*

**I**F you imagine that there is some train laid to blow you up ( as it often happeneth ) you may prevent the same, by washing certain Purses of Canvas, filled half full of good corn-powder, and with eight or ten fiery bullets of an inch, or an inch and half

half in height; and filling the other part of the Purse with slow Receipt, you may when you think good (the Receipt being well fired) throw the same from you, which will burst in pieces after the lighting on the ground, and disperse the said inclosed bullets here and there which bullets will burn furiously, and if there be any train of powder had near, it will presently fire the same. The said purses are very good to throw out of hand, or may be shot out of a Morter-peece amongst men in battle-array, to disorder them, or into a Town; the Figure B. sheweth how to fill the purses, and the Letter C. sheweth the proportion of it, being made up, filled and coated over.

The receipt for making these bullets of Wilde-fire following: Take of Sulphur in meal six parts, of Rosin in meal three parts, melting the same in some pot or pan over a slow fire; then take of Stone-pitch one part, of hard Wax one pound, of Tar one fourth part, of Aqua-vitæ one half-part, of Linseed-oyl as much, of Verdegrease one fourth part, and of Camphir one eighth part, melting all these together likewise, and stir into the same two parts of Peter in meal; and taking the same from the fire, put therein four parts of bruised powder, working the same well together in your hands, and roul the same round of the bigness that you would have your balls of, boring two holes through the same a-cross, which when you would use, must be primed full of bruised Powder; these balls will be as hard as stone, and needeth no coating, and being fired will burn furiously, and cleave to any thing,

thing, not diminishing in quantity being burned  
to ashes, which ashes will kindle an Oaken  
board: If you please, you may shoot these bullets  
out of a Piece of great Ordinance. The Figures for  
the Purfes here followeth.



Short





## Short, but certain Rules for the

making all sorts of Fire-works for recreation, as Rockets, Fisgigs, Runners on the Line, Serpents, Starrs, Fire-wheels, Clubs, Jack in a Box, &c. Together with the quantity of all the ingredients thereunto belonging, and the manner of compounding them.

*How to compose a Castle of Fire-works with small charge, that in the firing will yield as much variety, and give as much content as any: Now published for the benefit of young Practitioners. By W. R.*

**I**N all things actual, a certain method is requisite to be observed. Therefore, such as intend to put in Practice these ensuing Instructions, are first to provide themselves of such Rocket Moulds as are suitable to the work they undertake. The description and proportion of them, I conceive somewhat needless, in regard any one may in Crooked Lane, London, be furnished with what fizes they please. This being premised, I shall begin with

*Fisgigs, by many called Serpents.*

**T**HE best way of making them is thus: having provided a small mould without a Needle, make

make a Coffin of paper fit for it, which choak half an inch from the end; then put it in your mould, and fill up three inches with powder-dust only, finely beaten and sifted, then choak it again, and afterwards fill it about an inch with corn powder, then choak it close, and your Fisgig is prepared. To use these on the tops of great Rockets, put into the mouths of them some of the Composition for Starrs, which will shew very delectable to the Spectators; for after they have continued a good space in the form and manner of Starrs they will then riggle to and fro, like so many flying Serpents: Of these Fisgigs most sorts of Fire-works are composed. When you can perfectly make these, you may then proceed to the making,

*Runners on a line.*

**A**ND for them is likewise requisite a Mould, five inches long without a Needle: first make your Coffin of paper, choak it at the end as before, then put it in your mould, and fill it four inches with Powder-dust. (Note that in the filling it you must put in but a little at a time, and ram it down close, and so of all others.) Then choak it, and fill the rest of it with corn Powder (to give a report) leaving only so much of the Coffin void as will serve to choak it. This being done tie it to a hollow Cane three inches long; so as in tying of it you do not bruise the Rocket. And so have you a single Runner for the Line finished.

If you desire to have a double one to run forwards, and back again, you must then be provided of two

Run-

Runners made after the manner of the former, only one to be an inch longer than the other : And to finish these, use this method. First, tie the long Rocket to the Cane, and at the mouth of it, fasten the breech of the short one, by rolling over them a little piece of paper, with some powder-dust in it to give fire to the long one, not forgetting to make a small hole in the breech of the short one with a bodkin, that so the long one may take fire : having done so, then, turn back the short Rocket so, that the mouth of it may reach somewhat further than the breech of the long one; lest in firing it you accidentally fire both, and by that means spoil your Runners; The best way of tying the double ones is to fasten the short one so, as the long one may be betwixt it and the Cane; for by that means it will run without swagging; whereas, if they be both joyned to the Cane, as Mr. Bates and some others direct, it is both unsafe, and uncertain; unsafe in this, in case the first accidentally break, the other with the force of it will be struck off; and uncertain it is likewise, in regard after the first Rocket is spent, the Coffin of it coming back will swag and retard the passage of the other, and by that means indanger burning of the Line. Let your Line be well rubbed with soap; which will both secure it from fire, and facilitate the passage of the runner, likewise for these and all other, let your Powder-dust be beaten, and sifted very small, for the least cornes in it may danger the breaking.

*How to compose a Wheel.*

**F**irst, provide a Wheel, either round or square, the better sort are 8 square, made fit to the length of the Rocket, five inches each, the best proportion is about sixteen inches diameter. Now having provided a Wheel, take so many Rockets, made after the same manner as those are which run on the line, which you must fasten together, by joining the mouth of the one to the breech of the other, in the same manner as those for the line; in the tying them on, have a care you do not bruise them, and be sure to leave some space betwixt the mouth of the first, and the breech of the last, that so by firing the first the last may not take, and by that means breed a confusion.

You may order these Wheels to burn either Horizontal or Vertical, for the Horizontal provide a post, or staff, with a pin on the top of it to put the wheel on; if vertical, then provide a pin fastned to the side.

*How to make a Club to cast forth diuers Fisgigs.*

**T**O do this, first cause a piece of wood to be turned four inches diameter, let it be bored with an Augur of an inch and half bore from the top towards the bottom, leaving a bottom somewhat above an inch thick, and a place underneath to fasten a staff in; the length of it may be about eighteen inches: then draw a line spiral wayes about it from the bottom to the top in manner of a screw, each  
line

line an inch and half asunder, in that line bore small holes an inch asunder within half an inch of the bottom, and then pierce it through with a Piercer; let your holes be of that bigness fit to contain a Fisgig, and make them somewhat slope-ways, that so the Fisgigs may stand fast, though slack otherwise they will not come easily forth.

Load you Club or Trunk with the composition following, and then put in your Fisgigs made as before, priming each of them, and likewise each hole with powder-dust, then fire your Club at the top, and they will fire one after another, and fly about in a confused manner.

*The Composition for this Club is.*

Roch Peter eight ounces, Sulphur vivum four ounces, powder dust two ounces, Camphire one ounce, Linseed oyl half an ounce; beat and mixe these according to the order prescribed in the compositions following.

*To make Rockets for the Air.*

**P**ROvide first a good mould of what size you please, with a Needle in it, and a Rower with two Rammers, the one hollow for the Needle, and the other sad, to ram it after the Needle is covered. Having made a good strong Coffin of paper fit for the mould, and choaked as before, then fill it with the composition for that size your Rocket is of, the several proportions and mixtures hereafter follow. To fill it, take a little tin scope, and put in about the twentieth part of the quantity it holds, and then ram it with your hollow ram-

K 2

mer;

mer, and so continue till you have filled it to the top of the Needle, alwayes beating it down with two or three good stroaks of a mallet, then fill in more almost to the top of the Mould, ramming it as before, but with your sad rammer, leaving only so much unfilled as that you may double down some of the paper and ram it close, making a little hole with a bodkin to give fire to some corn powder (to give a report) put within that Paper as is left unfolded down, and then choak it, next prime it, as shall be shewn hereafter, and then proceed to heading of it, which you may do severall wayes, either with Starrs, Serpents, Crackers, or golden Rain: the composition for the making these hereafter follows. To place these on the Rocket, First, make a thin Coffin of paper, the inside of it somewhat wider than the outside of the Rocket, which you may fit by rowling it on the outside of the mould, and fitting it to the Rocket, then fasten it to the top of the Rocket, and strew a little powder in it, having first made a small hole in the top of the Rocket to give fire to it: in this Coffin you may place short Serpents with the mouths downwards, made as before, or with Starrs only, Crackers, or golden Rain; having done this, take a piece of thin pastboard, and with a pair of Compasses make a round circle in it, then divide it in two, and with the one half make a cap taper-wise, fit to cover the head, and with gliew fasten it to it: then provide a dry Oser stick about eight times the length of the Rocket, strait, and flatted at the end, to this fasten the Rocket, tyed at both ends just in the choaking place, that so you may not loosen the  
com-

composition within, then poise the stick, by balancing it on your finger three or four inches from the mouth of the Rocket.

*The Ingredients for Rockets, for the Air of all sizes.*

**F**OR Rockets which contain from one ounce to four, to one pound of powder-dust, put two ounces of Charcoal dust: for Rockets which hold from five ounces to ten, to one pound of powder, put two ounces and an half of charcoal dust: and from Rockets which hold from ten to sixteen ounces, to one pound of powder put three ounces of charcoal dust; but be sure that both your powder-dust in this and all other be well beaten, and finely sifted, as likewise your coal dust. If by trying your composition you find it too strong, you may mend it by adding a small quantity of coal dust to it: if too weak then by adding a little powder dust. My advice is, to mixe a pretty quantity together, that so by the tryal of one Rocket you may be ascertained of the rest; for all powder is not of one and the same strength.

*Priming for Rockets.*

**T**AKE Cotton wick (such as the Chandlers use) and soak it in oyl of Camphire, then take it out, and roul it in powder-dust, then dry it, and keep it close, otherwise the strength of the camphire will decay. The composition for Starrs will likewise fire them,

*Composition for Starrs, and first for those of a blew  
and red colour.*

**P**owder mealed fine four ounces, Salt-peter two ounces, Sulphur vivum six ounces, beat these very fine, and then mix them, adding thereto one ounce of Aqua-vitæ and a quarter of an ounce of oyl of Spike. To make these up for use, Take a rouser about the bigness of an arrow, and rouse paper on it, and paste it close, then fill it with the composition before prescribed, and beat it hard, then cut it into short pieces half an inch in length, dipping one end in glew, and strewing the other with powder-dust, it is then finished, only let it be dry before you use it.

*A Composition for Starrs of a very beautiful colour, the  
easiest, best and surest way, never till now made  
publick by any.*

**S**alt-peter one ounce, Sulphur vivum one ounce, powder dust one ounce, Camphire a quarter of an ounce, beat these very fine and mixe them, afterwards make paste of them with the oyl of Turpentine, and then make up little pieces about the bigness of a Pease, which rouse in powder-dust, and let it dry. Of this sort you may put two or three dozen at the head of an ordinary Rocket, the charge and trouble of making is far less than any other way.

*To make golden Rain.*

**P**rovide your self of a good quantity of Goose Quils, cut them off at the end next the feathers, then



then fill the quills with the following composition, and they will make a very glorious shew. To one quarter of a pound of powder-dust add half an ounce of coal dust, and for use put the open end of the quill downwards.

*To make a Jack in a Box.*

**P**rovide a tin box six inches deep, with a socket made under the bottom of it to place it on a staff, let it be of what bigness you please, in the bottom of it strew some corn powder almost half an inch thick, then fill it with Serpents, or Fishgigs placed with the mouths downward, leaving a place in the midst for a cane to pass through, which fill with a slow composition; (that for Starrs, or these following are very good) then put in the cane, and fasten a cover of pasteboard very close over the box, that so it may not fire before its appointed time.

*A composition that burns with a flame slow and sure.*

**R**och peter four ounces, Sulphur vivum two ounces, Camphire one quarter of an ounce, powder-dust one ounce. Meal these very fine and mixe them, adding thereto one quarter of an ounce of Linseed oyl, and a quarter of an ounce of oyl of peter dropped in by degrees, and so wrought to a paste. To meal your Camphire, dip the pettle in oyl of Almonds.

*Another sort of mixture that burns sparkling.*

**P**owder-dust four ounces, Coal-dust two ounces; this rammed close in a Cane, renders the sight very delectable to the spectators.

*A composition for a white fire, that lasteth long.*

**S**alt-peter eight ounces, Powder-dust two ounces, Sulphur vivum four ounces, Oyl of Peter one ounce, Camphire half an ounce; meal those which are to be mealed, and incorporate them together.

*How to compose a Castle of Fire-works with small charge, that in the firing shall yield as much variety, and give as much content as any.*

**F**irst, provide an indifferent large frame of wood, four square, with little round Towers of Past-board, at the Corners, the best size is 18 inches square, and twelve inches high, let the bottom be made firm to stand on any place, and the sides with gates, (as your fancy shall direct) then fasten on the inside three ledges of wood on each side about, each ledge with a groof made on the top of it, then make so many holes in the frame of wood, suitable to the ledges, as you intend to have the Castle give reports: you may easily make eight to each ledge, which contains, 96 reports, you may add more, as you see cause; or at the top fasten many Crackers, which at the end will fire like a volley of shot: The manner of making these reports shall be shewed hereafter; and to place them, first, prime your groof with a slow composition, and from the uppermost Row to the second put a wick, primed, as for Rockets, and so from the second Row

to the third, leaving some hanging forth at the door to fire it, then put in your Reports the mouths inward, fix them to your grooves and cover it close, afterward fit a board four square to cover the top of the Castle, of each side half an inch broader than the Castle, on the four edges of it you may fasten Plasterboard cut stone-work wayes in manner of a battlement, and at each corner, place a small jack in a box, with a long Cane in each of them, filled with slow composition, made as before; which Canes let be of the largeness as may burn all the time the Castle is firing, in the midst of the board on the top, place a pin to put a wheel on, made of thin Deal board, five, six or eight inches square, proportionable to the length of the Rockets, which fasten to the board by making holes in it, to tie them to it: on the top of this Wheel you may fasten little statues of Babies, as Souldiers, Drummers, or the like: and as the Wheel turnes, they will move about like Anticks, with much delight to the spectators: And so have you finished your Castle. To fire it first, Fire the four Canes in the four Boxes at the corners, then fire the Wheel at the top, and lastly, fire the cotton wick at the Gate, and so the reports will by degrees fire upwards, and in the end conclude with a volley of shot. If it be exactly made, it will continue a long space with abundance of delight,

*How to make Reports for a Castle.*

**F**irst make a Coffin of paper choaked as before, of what size you please, then fill it about an inch

inch and a half with corn powder, ramming it close, and at the end ram in a piece of paper as you do to a musket, leaving the mouth open, and then it is finished: When you use them, prime the mouth of it but a little.

*How to make Rockets for the ground.*

**F**irst, provide a Rocket ( ready finished ) as for the fire, then put the breech of it into a bladder, blow the bladder up, and then fasten it at the choaking place, by tying it close: when you fire it, throw it from you, and the force of it when it comes to the ground will make it rebound, and so be in a continual agitation!

*An almanack whereby to find the dayes of the Month this present year 1653. Which with the transposition of the moneths yearly, will serve for ever. Note, that the year begins at March.*

6 August	3 May	11 January	2 Aprill	7 September	4 June	12 February
		8 October	5 July	10 December		1 March
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Thirty dayes hath *September*,  
*April June* and *November*.

*February* hath eight and twenty alone,  
All the rest have thirty and one.

*An explanation of the foregoing Table.*

Note that where the months end, you must then begin at the first figure of the Table, and that every leap year *February* hath 29 dayes.

*To find the day of the month by the foregoing Table.*

Observe that the Mondays that happen in each Month, will fall upon those dayes of the Month that are expressed in the same Colume underneath it. As for instance, the Mondays in *August* are on the 1, 8, 15, 22, 29. dayes of it; those in *September* and *December* are on the 5, 12, 19, 26. dayes, and so of the rest. Now by this to find the day of the month you desire, first, find the Moneth, and under it that Monday of the month last past, and then you may easily know it: As for example, if you desire to know what day of the month the first Sunday in *May* will be: First, find *May*, under it you will see a Figure of 2, being the first Monday, then reckon Tuesday 3, Wednesday 4, Thursday 5, Fryday 6, and Saturday 7. and so of the rest. Again, if you would know what day of the week the 18. of *November* will be, look under *November* and you shall find the Monday next before it to be the 14, then reckon Tuesday 15, Wednesday 16, Thursday 17, and Friday 18. and so of the rest.

**F I N I S.**



## Necessary Directions for Drawing and Painting.

*How to take the perfect draught of any printed, or  
painted Picture.*

**T**AKE a sheet of Venice paper, or else of the finest white paper that you can get: wet it all over with clean Sallet-oyl, then wipe the oyl off from the paper as clean as you can so that the paper may be dry, otherwise it will spoil a printed picture, by the soaking through of the oyl. Having thus prepared your paper, lay it upon any painted or printed picture, and you shall see the picture through the same more perfectly appearing than through glass, and so with a black Lead Pen you may draw it over with ease and better first with a soft Charcoal, and then with a pen. After that you have thus drawn the picture upon the oyled paper, put it upon a sheet of clean white Paper, and with a little stick pointed, or (which is better) with a feather taken out of a Swallowes wing, draw over the Picture again, and so you shall have the same very prettily and neatly drawn upon the white paper, which you may set out with Colours, as shall be taught hereafter.

*Another way.*

Having drawn the picture, ( first open the oyled paper ) put it upon a sheet of clean white paper, and tick over the same drawing with a good big pin, then from the clean sheet that is pricked, pounce it upon another; that is, take some small coal, powder it fine, and wrap it in a piece of Tiffany or such like, and bind it up therein loosely, and clap it lightly over all the pricked lines by little and little, and afterwards draw it over again with a pen or pencil, or otherwise as you please.

*Another way.*

Take a sheet of thin white paper, and rub it all over one side with black Lead, or else with Vermilion tempered with a little fresh Butter; then lay the coloured side upon a sheet of clean paper; then lay the Picture you would copy out, upon the other side of the coloured paper, and with a small pointed stick, or with a Swallow's feather, go over all the strokes of your picture that you desire, and then you shall have all the strokes drawn very prettily on your white paper.

*Another way.*

Take a piece of clear Lantern-horn, and lay it upon your picture; then with a pen made of a Ravens quill, draw the strokes of your picture upon the horn, and when it is dry, breath upon the horn twice or thrice, and press it hard upon a piece of clean

clean white paper a little wetted, and the picture that you drew upon the horn will cleave fast upon the paper.

*Another way.*

Take a sheet of white paper, rub it all over with fresh butter, and dry it by the fire; then rub one side of it all over with Lamper black-lake: or any other colour finely ground, lay this paper upon a sheet of clean paper with the coloured side downwards, and upon it lay the picture you would copy out, and trace the stroaks over with a feather of a Swallow's wing, and you shall have your desire.

*Another way very pretty and easie to be performed.*

Take some Lake and grind it fine, then temper it with Linseed oyl, and afterwards with a pen draw with this mixture (instead of ink) all the out stroaks of any printed picture, also the muscels, then wet the contrary side of the picture, and press it hard upon a sheet of clean paper, and it will leave behind it all the stroaks of the said picture that you drew over.

*Another way much like the former.*

Take printers blacking, grind it fine, and temper it with fair water, and with a pen dip therein, draw over the master stroaks and out lines of the Muscels: wet then a fair paper with a sponge, and clap the picture upon it, pressing it very hard thereupon, and you shall find the stroaks you drew, left upon the fair paper.



## Of Painting.

*Of washing Maps, and other printed Pictures.*

**W**ashing Pictures is nothing else but the setting of them out with Water-colours, and for the effecting hereof you must be provided with store of Pencils, some smaller than other, also with Allum-water; Lime-water, Gum-water water made of Sope-ashes, Size, Varnish, and store of good Colours well prepared.

*How to make Allum-water.*

**T**ake a Quart of Water and boil it with a quarter of a pound of Allum, seeth it until it be molten, and let it then stand a day; with this water you must wet over your Pictures that you intend to colour, for it will keep the Colours from sinking into the Paper, also it will add a lustre unto the Colours, that is, make them to shew fairer, and it will also make them continue longer without fading; some paper will need to be wetted four or five times. You must let the Paper dry of it self after you have once wetted it, before you either lay on your Colours, or before you wet it again, if so be it need a second or more wettings.

*How*

*How to make Gum-water.*

**T**AKE clean water, and put into it of Gum Arabick a little, and let it stand untill the Gum be dissolved. Now you must have a care that it be neither too thick by reason of the Gum, nor yet too thin: for with the one you cannot work well, and the other will not bind fast enough; with this water you must temper your Colours before you lay them on your Picture.

*How to make Lime-water.*

**T**AKE unslack'd Lime and cover it with water, an inch thick, and let it stand so one night, in the morning pour off the clear water, and reserve it in a clean thing for your use; with this water you must temper your sap green, when you would have a blew colour of it.

*How to make water of Sope-ashes.*

**S**TEEP Sope-ashes a night in Rain water, in the morning pour off the clearest: this water is to temper your Brasil with.

*How to make Size.*

**T**AKE a quantity of Glew, and let it steep a night in water to make it the readier to melt in the morning; then set it on a coal of fire to melt, which done (to try whether it be neither too stiff, nor

nor too weak, for the meanest is best) take a spoonfull thereof, and set it in the air to cool, or fill a muscle-shell with it, and let it swim in cold water to cool the sooner: If it be too stiff when it is cold, put more water unto it, if too weak then put more Grew unto it, and when you will occupy it, make it lukewarm, and so use it: this is to wet your cloaths in if you intend to paste your Map or Pictures upon cloth.

*How to prepare your Colours.*

**S**uch as have need of grinding, you must first grinde them with fair water, and then put them upon smooth chalk-stone, and let them dry: then grinde them again with Gum-water, and reserve them in muscle-shells for your use.

Choose to lay on the thinnest and most transparent colours, especially if it be good work that you are to colour, so the one will set out the others: but if the work be none of the best, then endeavour to hide the imperfections thereof by laying your colours the thicker on it.

*A Sea-colour.*

Take Privet-berries when the Sun entreth into *Libra*, about the thirteenth of *September*, dry them in the Sun; then bruise them, and steep them in Allum-water, and strain them into an earthen Porringer that is glazed: or you may use them before you dry them, for the drying of them is to make them keep long.

*Another.*

Take blew Inde and steep it in water, and put to it a little Verditer.

**L**

*A yellow*

*A yellow colour.*

Take yellow berries and bruise them a little, and steep them a quarter of an hour in Allum-water, then strain them if you will, or let them stand in the liquor, and work therewith.

*A Russet colour.*

Take the fastest Sute you can get, and put it into a pot of clear water, so that it be covered two or three fingers, and let it seeth well, which done, strain it through a cloath, and set it on the fire again to thicken (but take heed you set it not on too hot a fire, for fear of burning it) so let it boil gently untill it be as thick as you would have it.

*Colour for Faces.*

First, lay upon the cheeks little spots of Lake or red Lead, then come all over it with white, and a little Lake; shadow it with Lamblack or Umber, and white Lead.

*Hair Colour.*

Take umber of Spanish brown, grinde it and temper it with Gum-water.

*Colours for naked Pictures.*

Take white Lead and a little Vermilion, temper them and lay them on, shadow it with Bolearme-nick in the middle, and adde a little Sute to the utmost or double hatches.

*A Colour for dead Corps.*

Change white Lead with a little of the water of yellow

yellow berries, and wash the Picture all over, then change it with blew Inde, and shadow it with blew Inde, and shadow it in the single hatches and leanest places : then take Saff, yellow berries and white Lead, and with that shadow the darkest places.

*A blood-red colour.*

Sinaper, Lake, and Vermilion make a good blood red : Some have commended Mutton blood very highly, but I never tried it.

*How to make Mutton blood-red.*

Take some of the clearest blood of a Sheep, and put it into a bladder, and with a needle prick holes in the bottom of it, then hang it up to dry in the Sun; this saith a Painter (that told it me for a special experiment) will make transparent and excellent blood-red colour, which you may also dissolve in your Allum water, according as you have need thereof.

Colours for Garments.

*A Purple Colour.*

Take Logwood and seeth it in Vinegar and small Beer in an earthen pot, and put a little Allum there, untill you taste it to be strong on the tongue.

*A red Colour.*

Boil Brasil as you did the Logwood, and it will make a red colour : if you would have it a sad red,

mingle it with pot-ash-water, if you would have it of a light red, temper it with white Lead.

*A Crimson.*

Cynaper tops : Cynaper lake : or Vermilion.

*A green-colour.*

Take Privet berry-water, and change it with yellow berry water, and it giveth a perfect green, for the ground and it is much used.

*Another green.*

Take Spanish green clean pickt and steeped in Rhenish wine: strain it, and put it into a little Honey or white Sugar-candy, and it will make an excellent green.

*For a light green.*

Temper Verdigrease and white Lead, 2 Verdigrease, as much yellow berries, and a little white.

*Yellow-colour.*

Orpiment and Saffron, Masticot, Gambougiun, either of these give a very good yellow.

*Blew Colours.*

Verditer, Azure or Bice, blew Indo.

*Colours for building.*

Lay black and white Lead for the walls of Churches, Conduits, and greater buildings; Blue for the pillars, and lesser houses; red Lead for Tiles; for the Leads blew and white; for Cottages set alone.

Colours

*Colours for Landskip.*

Lay Verditer, blew, white, and green; or first go all over it with Saffron, and white; then put a little Sot to them, and go over it again.

Or first take green and white Lead, and go over it, shadow it with a little more green, then with white, and last of all with green, a little white and yellow berries.

*Sky-colours.*

Brasil and white Lead is the lightest, then light purple and white, then Inde blew and white, the darkett of all is Inde blew.

*Cloud-colours.*

The lightest of all is white Lead and Inde blew, a like quantiry of each; the next, a great deal of Inde and a litle white; then purple and white with a little Brasil; then white Lead and yellow berries.

*Colours for the Sun-beams.*

Lay yellow berries with a little white, shadow it with Saffron and red Lead.

*A Motley-green.*

This colour is compounded of red and green.

*A Lincoln-green.*

This colour is compounded of a good green and Saffron.

*A Popinjay green.*

This colour is compounded of Azure and Masticot, or blew and yellow.

*An excellent green.*

Take Copper plates, put them into a pot, and put

L 3

some

some distilled Vinegar unto them, set them in a warm place untill the Vinegar become blew, then pour that liquor or coloured Vinegar into another Pot well leaded, and pour more Vinegar upon the Copper-plates again, letting that also stand untill it be of a blew colour, then pour it unto the former liquor, this you may do so often untill you have liquor enough, then let that liquor stand in the Sun untill it be thick enough.

*A Lion-tawney.*

This colour is made of red lead and masticot.

*A Peach colour.*

This colour is compounded of Ceruse and Vermilion.

*A Brass colour.*

This is made of Masticot and Umber.

*A marble or Asb-colour.*

This colour is made with black and white.

*A Russet colour.*

This colour is made with a little white, and a good quantity of red.

*A brown blew.*

It is made of two parts of Inde baidias, and a third of Ceruse.

*A Crane-colour.*

It is onely made of red Lead ground with Gum-water.

*To write Gold with the pen or pensil.*

Take a shell of Gold, and put a little Gum-water into it, and stir it about, and then you may work with it as with colours.

Thus by a little practising and tempering your colours one with another, you may with the same colours



colours compound divers others that I have not mentioned, nay, almost what you list.



## Experiments perform'd by Legerdemain.

*How to make it freeze by the fire side.*

**T**His feat cannot be performed at every time, but only in winter, and at such times as snow may be had, and he that will shew it, must have in readiness an handfull of salt. The time serving, and the party provided, let him call for a joynt-stool, a quar-pot, and a handfull of snow, a little water, and a short staff or stick, first, let him pour a little water upon the stool, and upon it let him set the quart pot, and put the snow in to the pot, the salt also, but privately, then let him hold the pot fast with his left hand, and take the short stick in his right, and therewith churn the snow and salt in the pot, as if one should churn for butter, and in half a quarter of an hour the pot will freeze so hard to the stool, that you can scarcely with both hands pull it off from the stool: there is a natural reason may be given for this, which he that is a Scholar need not be told, and for a common Jug-

I would not have so wise as to know, therefore  
omit it.

*How to make two Bells come into one hand, having put  
into each hand one.*

**T**His feat must be performed with three Bells, you  
must put one Bell into your left sleeve, then put  
one bell into one hand, and another bell into the other  
hand ( they must be little Morris Bells ) withdraw  
your hands, and privily convey the bell in your left  
hand into your right hand : Then stretch both your  
hands abroad, and bid two folks hold your hands  
fast, but first shake your hands, and say, do you hear  
them. The Bell that is in your sleeve will not be  
known by the ratling, but that it is in your hand :  
Then say, he now that is the arrantest Whoremaster  
or Cuckold of you both, shall have both the bells,  
and the other shall have none at all : open your hands  
then, and shew them, and it will be thought that  
you deal by Art Mag'ick.

*How to make a Jugling Book, or Book of Waggery.*

**Y**OU must provide a Paper-book in Octavo, of  
what thickness you please; first turn over se-  
ven leaves of it, and then upon both the open sides,  
draw or paint the pictures of flowers, then turn o-  
ver seven leaves more, and paint the very same;  
do this untill you have turned the book once quite  
over; Then unto the farther painted leaves, paste  
a little stay of paper or parchment one directly over  
another: Then turn over the book again, and ha-  
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ving turn'd every sixth leaf, draw the picture of flower-de-luces, and then paste staves of parchment upon them as you did upon the first; but these staves, must all of them be a little lower than the former. Then turn over the book again, and after the fifth leaf throughout the book is turned, paint horns, do thus untill you have painted the book full of pictures, only let there be one part of the leaves fair paper; having thus finished the book, when you use it, hold it in your left hand, and with your right hand, your thumb set upon the parchment staves, shew them orderly and nimbly, but with a bold and audacious countenance, for that must be the grace of all your tricks: say, This book is not printed thus as some of you may suppose, but it is of such a property, that whosoever bloweth on it, it will give the representation of whatsoever he is naturally addicted unto, and then turn the book, and say, see its all fair paper.

*Boxes to change Grain.*

**M**AKE one Box of Wood, Tinne, or Brass: let the bottom fall a quarter of an inch into the box, and glew thereon a laying of barley, or such like grain: draw the box with the bottom downwards, and say, Gentlemen, I met a Countrey man going to buy barley, and I told him I would sell him a penyworth, also I would multiply one grain into so many bushels as he should need, then cast a barley-corn into your box, and cover it with a hat, and in the covering it, turn the bottom upside down: then cause some body to blow on the hat, then

then uncover it, and they will think strangely of it. You may make another box of wood, like unto a bell, to hold so much just as your former box will, and make a bottom unto this box of shoe-sole leather, to thrust into the bottom of the bell: then fill it with barley, and thrust up the leather bottom, for it will keep the barley from falling out, take this box out of your pocket, and set it down gently upon the table, and say, I will not cause all the barley to go out of my measure into my bell, then with a hat cover the box that hath the barley, glewed unto it, and in covering it, turn it with the barley downward: then say, first, let us see whether there be nothing under the bell, and clap it hard down upon the table, so the weight of the barley will thrust the bottom down; then bid some one blow hard on the hat, then take it up, where they will see nothing but an empty measure, then take up the bell, and all the barley will pour out. Sweep it then presently into your hat or lap, lest their busie prying may chance to discover your leather bottom.

*A Conceit to procure Laughter..*

**T**AKE a ball in one hand, and another in the other, and stretch your hands as far as you can one from the other, and if any will, lay a quart of wine with him, that you will not withdraw your hands, and yet will make both of them come into either hand which they please: It is no more to do; than to lay one down upon the table, and turn your self round, and take it up with the other hand, and your wager is won, and it will move no small laughter to see a fool so loose his money.

*How*

*How to knyt an hard knot upon an handkercher, and to seem to undo the same with words.*

**M**AKE one plain loose knot, with the two corner ends of a handkercher; and seeming to draw the same very hard, hold fast the body of the said handkercher (near to the knot) with your right hand, pulling the contrary end with the left hand, which is the corner of that which you hold. Then close up handsomely the knot, which will be yet somewhat loose, and pull the hankercher so with your right hand, as the left hand end may be near to the knot: then will it seem to be a true and firm knot: And to make it appear more assuredly to be so indeed, let a stranger pull at the end which you hold in your left hand, while you hold fast the other in your right hand; and then holding the knot with your fore-finger and thumb, and the nether part of your handkercher with your other fingers, as you hold a bridle, when you would with one hand slip up the knot, and lengthen your reins. This done, turn your handkercher over the knot with the left hand, in doing whereof, you must suddenly slip out the end or corner, putting up the knot of your handkercher with your fore-finger and thumb, as you would put up the aforesaid knot over your bridle. Then deliver the same (covered and wrapt within the midst of your handkercher) to one to hold fast, and after the pronounciation of some words of art, and wagers laid, take the hankercher and shake it, and it will be loose.

*How*

*How to transform any one small thing into another form by folding of paper.*

**T**Ake a sheet of paper and fold or double the same, so as one side be a little longer than the other: then put a Counter between the two leaves of the paper up to the middle of the top of the fold, holding the same so as it be not perceived, and lay a Groat on the outside thereof, right against the Counter, and fold it down to the end of the longer side: and when you unfold it again, the Groat will be where the Counter was, and the Counter where the Groat was, so as some will suppose that you have changed the money into a Counter, and with this many feats may be done.

*How to convey Money out of one of your hands into the other by Legerdemain.*

**F**irst, you must hold open your right hand, and lay therein a tester, or some big piece of money, then lay thereupon the top of your long left finger, and use some words of Art, and upon the sudden, slip your right hand from your finger, wherewith you held down the tester, and bending your hand a very little, you shall retain the tester still therein, and suddenly drawing your right hand thorow your left, you shall seem to have left the tester there, especially when you shut in due time your left hand. Which that it may more plainly appear to be truly done, you may take a knife, and seem to knock against, so as it shall make a great sound: but instead

stead of knocking the piece in the left hand (where none is) you shall hold the point of the knife fast with the left hand, and knock against the tester held in the other hand, and it will be thought to hit against the money in your left hand. Then after some words of Art pronounced, open your hand, and when nothing is seen, it will be wondered at, how the tester came removed.

*How to make a Six-pence seem to fall through a Table.*

**Y**OU must have an handkercher about you, having a Counter neatly sewed in one of the corners of it: take it out of your pocket, and desire some body to lend you a tester, and seem to wrap it up in the midst of the handkercher, but retain it in your hand, and instead of so doing, wrap the corner in the midst that hath the Counter sewed in it, and then bid them feel if it be not there, which they will imagine to be no other than the tester that they lent you, then bid them lay it under a hat upon the table, and call for a basin of water, hold it under the table, and knock, saying, *vade*, come quick, and then let the six-pence fall out of your hand into the water. Then take up the hat, and take the hankercher and shake it, saying, that is gone, then shew them the money in the basin of water.

*How to seem to blow a six-pence out of another mans hand.*

**T**AKE a six-pence, blow on it, and clap it presently into one of your spectators hands, bidding them

them to hold it fast : Then ask of him, if he be sure to have it, then to be certain, he will open his hand and look. Then say to him, Nay, but if you let my breath go off, I cannot do it. Then take it out of his hand again, and blow on it, and staring him in the face, clap a piece of horn in his hand, and retain the six pence, shutting his hand your self. Bid him hold his hand down, and slip the tester between one of his cuffs. Then take the stone that you shew fears with, and hold it unto his hand, saying, *By vertue hereof, I will and command the Money to vanish you hold in your hand, Vade*, now see : when they have looked, then they will think that it is changed by the vertue of your stone. Then take the horn again, and seem to cast it from you, retaining it, and say, *Vade*, and anon say, you have your money again : He then will begin to marvel, and say, I have not, say then to him again, you have, and I am sure you have it : Is't not in your hand ? If it be not there, turn down one of your sleeves, for it is in one I am sure, where he findeth it, he will not a little wonder.

*How to cast a piece of Money away, and to finde it in another mans mouth, pocket, or purse.*

**T**He Jugler calls for some one piece of Coin, as a tester or a shilling of any one in the company. he willeth him to mark it with what mark he will, then he taketh it, and casteth it away, and cometh to his confederate ( who is furnished beforehand with the like piece of Coin, marked with the very same mark ) and bids him deliver the money



ney out of his pocket, purse, or if he say the word, mouth; for this is concluded of before-hand. Now this confederate, to make the matter seem more strange, will fume and fret, asking how he should come by it, till having found the mark, he will confess it to be none of his; wondring at his skill, how he should send it thither: and all the rest be taken with a reall admiration of his extraordinary cunning.

*How by the sound of a Counter phillipped to tell what side is uppermost, whether crosse or pile.*

**T**He Jugler draws a Counter out of his pocket, and saith to the company, See here is a Counter, take it who please, and let him phillip it up, and I will by my cunning tell you whether crosse or pile be uppermost by the very sound, for you shall hood-wink me. Now there are three, or four, or more confederates in the place, who seeming strangers as well as the rest, will be very importunate to have the phillipping it, and before one of these shall have it, who by some sign of the fingers or countenance (fore-known to the Jugler) do give him information after he is demanded. Of the same nature is that trick formerly mentioned in the book, and called, The decollation of *John Baptist*.

To make one dance naked is a trick of the same nature, for the party afore-hand is agreed to do it, and also the manner and circumstances: So that the Jugler to blind the people, pronounceth sundry words to such a person, he then begins to rave like a mad man, and puts his cloaths off with a kind of violent

violent carelesness, though God knowes, the party knowes as well what he doth, as your self that reads it.

After the same manner shall you know what money another hath in his purse, and casting money into a pond, and finding it under a stone or threshold in another place.

Also to make a piece of money to leap out of a cup and run to another, by means of a small hair fastened to the money, which hair the Confederate guideth, with a multitude of such like strange feats, which may seem impossible to the judgement of the common people to be effected without the assistance of the Devil, or some familiar, which to nominate is neither needfull, nor will my occasions permit so much leisure as to do it.



## Experiments in Arithmetick.

### I.

*To finde what number of Men are contained in a square Battail.*

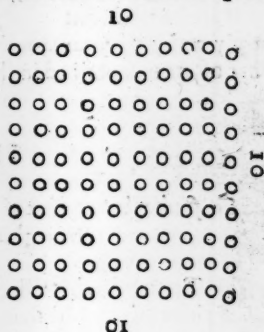
**A** Square in Geometry is called, A right lined plain figure, consisting of four equal sides, and so many right and equal angles; every

every of which sides is said to be the Square of the said figure, and any one of these sides being multiplied in it self, produceth a Square equall to the Square of whose side this multiplication was made.

Wherefore if you should come in place where a body of men were placed in a Square body, you may readily tell what number there is of them, by counting the number of men on any one side, and that number multiply in it self, the product of that multiplication shall be equall to the number of men in that whole body.

As for example.

If there were ten men on each side of the Square Battail ( as in this figure there is ) If then you multiply 10 into it self, the product will be 100, which is the number of men contained in the said Battail.



II.

To find what number of men are contained in a Battail, whose front and flanks are equal.

**T**His proposition very little differeth from the former, for whereas before you multiplied any

M

one

one side in it self, you must in this multiply the Front or Rear by either Flank, and the product shall give the number of men contained in the said Barrail.

**Example,**

Rear

oooooooooooooooooooooooo

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oooooooooooooooooooooooo

oooooooooooooooooooooooo

oooooooooooooooooooooooo

Front

Flank

Flank

Suppose there be 20 in the Front and 5 in the Flank, and you desire to know what number there is in the whole body : If you multiply 20 by 5, your product will be 100, the number of men contained in the whole Body.

### III.

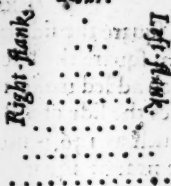
To find what number of men are contained in a  
Triangular Battail.

**A** Triangular battail cannot be composed except there be an odd man in the Front, and consequently, on either Flank: Wherefore, to find what number of men are contained in such a battail, you must multiply either Flank in it self, and the product shall be the number of men contained in the whole Battail.

**Ex-**

Example, Rear.

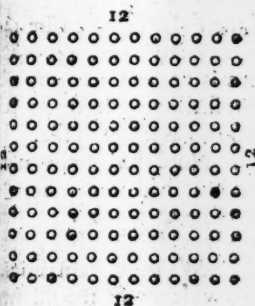
Let there be in either Flank 7, now we know that 7 is the Root of 49; wherefore you may conclude 49 to be in the whole.



IV

Of two Square Battails to make one intire battail, which shall contain both the other.

A General having in two severall places two square Battails of men, and commanding his major or other Officers to reduce them into one entire body, I demand how that may be done? Let the two Battails be unequal, as one of 10 the other of 6; as in this Figure is seen.



M 2

Example

## Example.

First, square the side of the greater Battail 10, *seci*  
 100. then square the side of the lesser Battail, 6 *seci*  
 36. which added make 136. the square root extra-  
 cted gives the side of a Battail equal to them both: but  
 for as much as 136 is no square number, you must  
 find the nearest square that may be less, and that  
 shall be the side of the entire Battail, which is 11.  
 wherefore place 11. in rank, and 11, in file, and  
 you shall have 121. in your Body, and 15. men o-  
 ver, which you may send out for Scouts or Cen-  
 tinels, or otherwise dispose of them as occasion  
 serveth.

## V.

*A number of men being delivered to an Officer to make  
 thereof a Square Battail, and suddenly to tell  
 how many ranks he shall have, and how  
 many men in each rank.*

Suppose the number of men delivered to be 144  
 S therefore extract the square Root of 144, which  
 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ is 12, and so many men  
 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ shall you have in flank  
 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ and as many in file.  
 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ Note that if the num-  
 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ber had not been a  
 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ square number, there  
 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ would have been some  
 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ odd men remaining  
 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ which you should have  
 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ disposed of as before.  
 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○  
 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

## VI. Th

## VI.

## A B C D E F

Wall of a Fort or Castle being thirty foot high, and the breadth of the Trench about the wall forty foot broad, I demand the length of a scaling-Ladder that will reach from the edge of the Trench to the top of the wall.

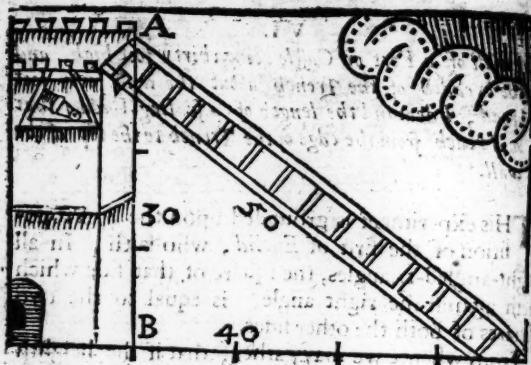
This experiment is grounded upon the 47 Proposition of the first of Euclid, who saith, In all right-angled-triangles, the square of that side which is against the right angle, is equal to the two squares of both the other sides.

From whence we may gather, that if the height of the Wall be squared, and the breadth of the Trench likewise squared, and those two squared numbers added together, and from them extracted the square Root, that Root so extracted shall be the length of the Scaling-ladder required;

As for Example, in the Figure following,

M 3

Let



Let *AB* represent the Fort, being 30 foot high, and *BC* the breadth of the Trench, 40 foot, then square 30, scit 900, likewise square 40, scit 1600: which added make 2500, the Root of which number is 50, the length of the Hypothensuall or Scaling ladder required.

## VII.

Admit the Semidiameter of the earth to be 3346 miles and that there is a Mountain one mile in height, I demand how far such a Mountain may be seen at sea or on Land.

Add the Semidiameter of the earth and the Mountain together, scit 3437, whose square is 11812969. From which subtract the square of the semidiameter of the earth, viz. 11806096, there remains 6873, whose Root is 82 and three fourths; wherefore you may conclude, that the Mountain may be seen almost 83 miles.

## VIII. How



## VIII.

*How to know the burthen of a Ship.*

**T**O perform this, you must take the length thereof at the Keel, the breadth at the Beam, and the depth in hold, and multiply them one in the other, the last product being divided by 100 gives you his Tunnage, which is the Kings allowance.

Example of a Ship whose length at the Keel is 65 foot, his breadth at the beam is 26 foot, the depth in hold 10 foot, which number multiplyed each by other, produceth 16900, which being divided by 100, gives you 169 Tun, which is the burthen of the said Ship.

## IX.

*The General delivered to his Master Gunner 3 Peeces of Ordnance, together with 168 pound of powder, the biggest of which Peeces spent at a shot 6 pound, the second 4 pound, and the third 2 pound, who commanded him to employ them against the battery of a Sconce, demanding of the Gunner, how many shots each peece would make, being discharged one as often as another, and also how much powder each Peece would spend.*

**L**Et the quantity of each Peece lib.

be set down into order, one 6 lib.  
under another, and added into 4  $\times 68$  sh.  
one entire sum, as 6. 4. 2.  $\frac{2}{12}$   $\times 22$  14  
fecit 12, behind which towards 12  $\times$   
the right hand set down the  
summe of the powder delivered, viz. 168. which if  
you divide by 12, the quotient will be 14, which  
certainly telleth that they will make 14 shots a peece  
against the Sconce.

M 4

Now

Now to know how much powder each Peece will spend, multiply 14 by 6, *fecit* 84, for so much will the first Peece spend; again multiply 14 by 4, *fecit* 56, so much will the second spend; and lastly multiply 14 by 2, *fecit* 28. so much will the last Peece spend; which being added into one entire summe, the total will be 168 pound, which is equal to the powder by the General at first delivered.

lib.

84

56

28

---

168

## IX.

A General having drawn the platform of Fort, demanded of 50 Pioneers what time they required to finish it in: who replied 6 weeks, or 36 dayes (which is all one) but the expedition was such that it must be finished in 8 dayes, now would I know what number there must be employed.

THE resolution of this question to some may seem difficult, but to others very plain and easie, for if you multiply 50 (which is the number of Pioneers) by 36 (the number of dayes which they require) and divide that product by 8 which is the time that the Fort must be finished in) the quotient of that division will be 225, and so many must be employed to finish it in eight dayes.

Pleasant



# Pleasant QUESTIONS IN ARITHMETICK.

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## Question I.

*To tell the number that another man shall think, be it never so great.*

**L**Et the party that thinketh, double the number which he thought, which done, bid him multiply the sum of them both by 5, and give you the product (which they will never refuse to do, it being so far above the number thought) from the which if you abate the last figure of the product (which will alwayes be a Cipher or 5) the number thought will remain.

### *Example.*

Let the number thought be 53, which doubled maketh 106, and multiplied by 5, make 530; then if you take away the Cipher which is in the last place, there will remain 53. the number thought.

Quest.

## Quest. II.

*Of the accusation of a Thief.*

**A** Thief breaking into an Orchard, stole from thence a certain number of Pears, and at his coming forth he met with 3 men one after another, who threatened to accuse him of theft, and for to appease them, he gave unto the first man half the Pears that he stole, who returned him back 12 of them. Then he gave to the second half of them he had remaining, who returned him back 7. And unto the third man he gave half the residue, who returned him back 4, and in the end he had still remaining 20 Pears. Now do I demand how many Pears he stole in all? To answer this question you must work backward; for if you take 4 from 20, there will remain 16, which being doubled make 32, from which abate 7, and there will remain 25, which being doubled makes 50, from which subtract 12 and there will remain 38, which again doubled make 76, the true number of Pears that he gathered.

## Quest. III.

*Of Three Sisters.*

**A** Certain man having three Daughters, to the Eldest he gave 22 Apples: to the second he gave 16 Apples: and to the third he gave 10 Apples: and sent them to the Market to sell them, and gave them command to sell one as many for a penny as the other (namely 7 a penny) and every one to bring him home so much money as the other, and neither change

change either apples or moneys one with another ;  
How could that be ?

This to some may seem impossible : but to the Arithmeticians very easie. For whereas the eldest had 3 peniworths, and one apple over, the second two peniworths and two apples over, and the youngest had one peniworth and three apples over : So that the youngest had so many single apples, and one peniworth, as the eldest had peniworths and one apple over, and consequently the second proportional to them both.

They made their Markets thus : A Steward coming to buy fruit for his Lady, bought all the apples they had at 7 a penny, leaving the odde ones behind, then had the eldest Sister three pence and one apple, the middle Sister two pence and two apples, and the youngest one penny and three apples. The Steward bringing the fruit to his Lady, she liked it so well, that she sent him for the rest ; who replied that there were but few remaining : she notwithstanding sent him for them, and bid him bring them at any rate. The Steward coming to the Market again, could not buy the odde apples under a penny a piece ( who to content his Lady, was fain to give it ) then had the youngest Sister three peniworths, the middle Sister two peniworths, and the eldest one peniworth, and so had they all four pence a piece, and yet sold as many for a penny one as another, and neither changed apples nor moneys one with another, as they were commanded.

Quest.

## Quest. IV.

*Of one that bought and sold both at a rate, and yet in the end proved a Looser.*

**A** Man bought 100 Egges at three a penny, having 120 to the hundred, also he bought a hundred more at two a penny, having likewise 120 to his hundred, these Egges being mingled, he sold them away for 5 two-pence, and 120 to the hundred as he bought them, the question is, whether he gained or lost in that bargain.

If you work by the Rule of Three Direct, you shall finde that his 120 Egges at 3 for a penny came to three shillings four-pence, and his 120 at 2 for a penny came to 5 shillings, which being added make 8 shillings 4 pence. Then again to see what they come to at 5 for 2 pence; work likewise by the rule of Three Direct, and you shall finde that 240 at 5 for 2 pence, comes but to 8 shillings, whereby the seller loseth 4 pence of the money they cost him.

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**Experi-**



## Experiments in Geometry.

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### I.

*How to take the Altitude of a Building, or other approachable height, by a line and plummet, the Sun shining.*

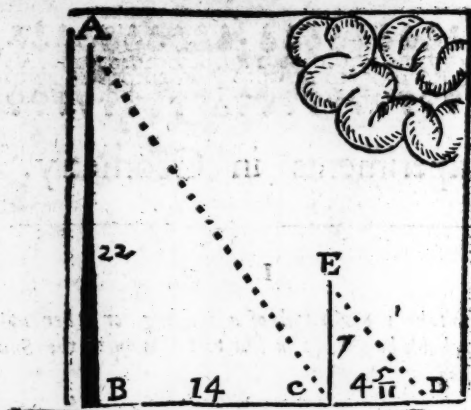
**L** Et the Building whose Altitude you desire to know be AB representing a May-pole, casting his shadow in a right line on the ground to C, at C let fall a line and plummet (whose length before you know in feet or inches) observing where the end of that shadow lights; which suppose at D, then measure the length of the shadow of the string, and consequently the shadow of the building, both which being exactly taken, work thus by the Rule of Proportion.

If C D, the shadow of the line and plummet 4 foot, and  $\frac{1}{11}$  give E C, 7 foot in altitude;

What altitude doth 14 feet give, which is the length of the shadow of the May-pole.

Multiply and divide according to that Rule, and you shall finde in your quotient 22 foot, which is the true altitude of the building required.

### II. How



## II.

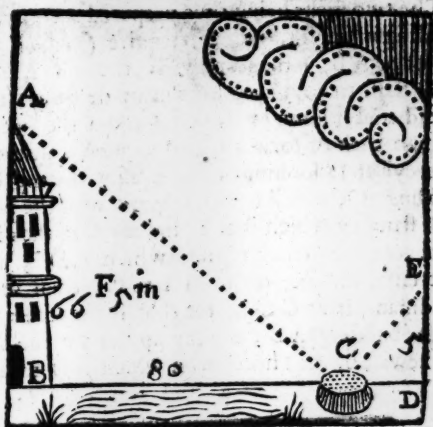
*How to take the Altitude by a Bole of water.*

**P**Lace on the ground a Bole of water, which done, erect your body strait up, and go back (in a right line) from the building till you espy in the Center or middle of the water the very top of the Altitude; which done, observe the place of your standing, and measure the height of your eye from the ground, together with the distance from your standing to the water, and the distance of the water to the Base or foot of the Altitude; which being all exactly taken, will help you to the Altitude required, by the rule of proportion.

*Example.*

Let the Altitude required be A B, the Bole of water placed on the ground at C, then go backwards from C (your body erected as strait as may be) tie your





your eye at E, spy the top of the Altitude A B in the water, which found observe the place of your standing at D, and measure the altitude of your eye to the ground, which is 5 foot, then measure the distance from D to C, which is 6 foot, and likewise the distance from C to B, which is 80 foot, these 3 distances had work by the rule of proportion. Thus *As the distance C D is to the Altitude E D, So is the distance C B to the Altitude A B: Which is 6 foot and 8 inches.*

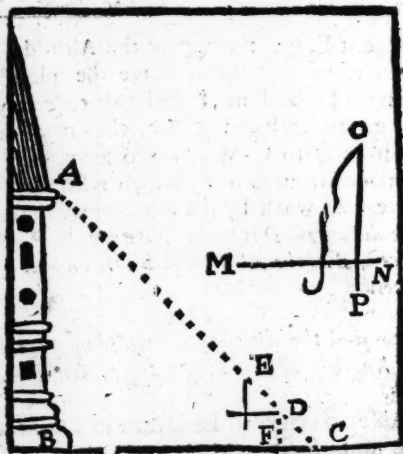
### III.

*How to find the Altitude of a building by two sticks of one length joyn'd in a right angle, without Arithmetick.*

**C**Ause two sticks to be joyned in a right-angle, as is in the figure, M N, and O P, having at O a hole made wherein to hang a thread and plummet.

The

The two sticks being thus prepared, come to the building whose altitude you require ( which building let be A B, ) then applying the end A of your cross staffe to your eye, hold it up or down till the thread and plummet hang just upon the line C D, then go back or forward ( as occasion is given ) till your eye at D looking over E espy the top of the building at A which found ; mark well the place of your standing, which is at F, and measure the distance from your eye to the ground, which is D F, and set that same distance off from F to C, then measure the distance from C to B, for that is the true height of the building A B, as may appear by the figure, & likewise by the Theorem on which it is grounded.

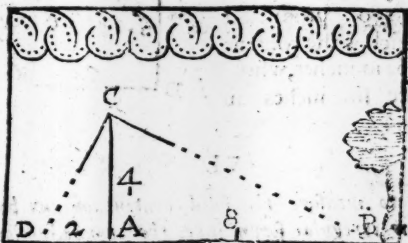


## IV.

*How to finde a distance by the two Sticks joyned square.*

**T**His Experiment is grounded upon the 4 Prop. of the 6 of Euclid.

Let the distance which you desire to know, be A B. set up a staffe at A. of 4 foot long, (or more or less, at your pleasure,) at A C. at the end of the staffe C. place a third C D. then hanging the angle of the square O. on the top of the staffe at C. lift it up or down, till you see the farthest part of your Longitude, the square so remaining, and the staffe not removed, draw the string that is fastened at C. close by the side of the square, till it touch the ground at D. then measure how many times the distance D A. is contained in the staffe, for so many times is the staffe contained in the Longitude.



*Example:* The staffe supposed 4 foot high placed at A. and the square being hung thereon at C. the one end thereof pointing at B and the other to D. then

N

mea-

measure the distance  $DA$  and you finde it to be two foot, then say, if  $CA$  contain  $DA$  two times  $AB$  shall contain  $CA$  as many, that is 8 foot, as may appear by the figure.

## V.

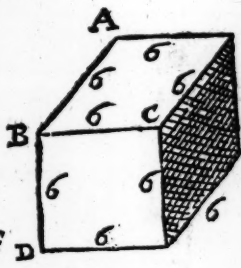
*How to measure the solidity of a Cube.*

**T**He Cube is a body composed of 6 square superficies of equal proportion, and is measured in manner following.

If you multiply any one side in it self cubically, it produceth the said Cube.

*Example.*

Let the Cube  $ABCD$  be given to be measured, the sides whereof are six inches in length: the square whereof is 36 which again multiplied by the root produceth 216, which is the content of a Cube in inches, whose sides are six inches in length.



## VI.

*How to measure the solid content of any body how irregular soever it be, the form or fashion not regarded.*

**T**O perform this you must prepare an hollow Cube, into which put your irregular body, which

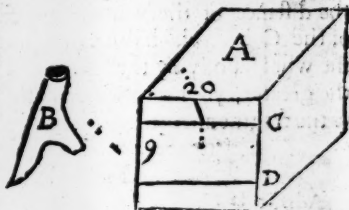
which being placed therein you shall pour in so much water till it no more than cover the body in the Cube, then make a mark in the inside of the Cube where the superficies of the water toucheth. This done, take out the irregular body, and mark again directly under the former, where the brim of the water now toucheth, for the distance of these 2 marks, multiplyed by the square of the Cubes side, produceth the crassitude of that irregular body.

*Example.*

Suppose A. to be the cubical hollow vessel, whose inward side suppose to be twenty inches: B. the irregular body whose crassitude I desire. First, therefore I put B. into the hollow Cube A. and pouring in water till

it be thoroughly covered, admit the brim of the water reach unto C. then taking out that irregular body again, admit the superficies of the water fall to D. then measure the distance between C. and D. which suppose it 9 inches,

which multiplyed in 400, the square of the Cubes side produceth 3600. and so many cubical inches are contained in the irregular body B.



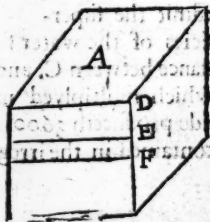
## VII.

*How the weight of any part or portion of a solid body may be known, without separation thereof from the other part of the body.*

**H**AVING a Cube prepared as before declared, first, put the solid body therein, which done fill the Cube top full of water, then softly lift that body out of the water, till such time as there remain no more in the water, then that portion whose weight you desire to know, at that instant make a mark on one side of the Vessel where the superficies of the water then toucheth, then take out the body all together, this done, measure the distance from the former mark to the superficies of the water as it is now after the body is taken quite out. Likewise measure the distance of the waters superficies from the top of the Cube, which done, augment the weight of the whole body by the lesser distance, and divide by the greater, your quotient will shew the true weight of the fragment required.

*Example.*

Admit B C. to be in all 100 pound weight being either brass, iron, silver, lead, stone, or other metal, my desire is to know the weight of the portion C, first, therefore putting the



whole

whole body into the vessel A. I fill it full of water, then lifting it softly up till all the body be out of the water excepting C. I finde the superficies of the water to be fallen to E. where I make a mark, then take out the whole body, admit the water is fallen to F. and that by measuring I finde E F. to be 8 inches, and D F. 20 inches, 8 multiplyed in 100 (the whole pillars weight) yieldeth 800, which divided by 20 (the greater distance) bringeth in the quotient 40, so many pound weight I conclude the portion C. to weigh.

### VIII.

*How Archimedes found what quantity of Gold was taken out of the King of the Syracusans Crown, and how much silver put in the room thereof, without breaking of the Crown.*

**H**iero. King of the Syracusans in Sicilia had caused to be made a Crown of gold of a wonderful weight to be offered for his good success in the wars; in making whereof, the Goldsmith fraudulently took out a certain portion of gold, and put in silver for it, so that there was nothing abated of the full weight, although much of the value diminished: Which thing at length being uttered, the King was sorely moved, and being desirous to try the truth, without breaking of the Crown, proposed the doubt to *Archimedes*, unto whose wit nothing seemed impossible, which although he could not presently answer, yet he had good hopes to devise some policy for that invention, and so musing thereon, as he chanced to enter into a bane full of

water to wash him, he observed that as his body entred into the bane, the water did run over, whereby his ready wit of such small effects conjecturing greater works, conceived by and by a reason of solution of the Kings question, and therefore rejoycing exceedingly (more than if he had gotten the Crown it self) forgot that he was naked, and so ran home, crying as he ran *inveni, inveni*, I have found, I have found, and thereupon caused two massie pieces, one of gold and another of silver to be prepared of the same weight that the Crown was of, and considering that gold is heavier of nature than silver, and therefore gold of like weight with silver, must needs occupy less room by reason of its more compact and sound in substance, he was assured that putting the mass of gold into a vessel brim full of water, there would not so much water run out, as when he should put in the silver mass of like weight. Wherefore he tryed both, and noted not only the quantities of the water of each time, but also the difference or excess of the one above the other, whereby he learnt what proportion in quantity is between gold and silver of equal weight, and then putting the Crown it self into the water brim full (as before) marked how much water did run out then, and comparing it with the water that run out when the gold was put in, noted how much it did exceed that, and likewise comparing it with the water that run out when the silver was put in, marked how much it was less than that, and by those proportions found the just quantity of gold that was taken out of the Crown, and how much silver was put in instead of it; by the which  
ever-



ever since the proportions of metals one to another, are tryed and found.

## IX.

*How a man may descend into the bottom of any Water or River, his body remaining dry.*

**T**HIS Experiment was shewed at Toledo, by two Greeks, who taking a Cauldron of great capacity, the mouth turned downward, and so hanging it in the air by ropes, they fasten certain shelves in the midst of the Cauldron, where they place themselves and a fire. Then to make it hang at *equa libra*, they compass the Circumference thereof with leaden plummets on every side equally, and made of equal weight, lest any part of the Circumference of the mouth of the Cauldron when it is equally and softly let down into the water, should sooner touch the water than the whole Circumference, so should the water easily overcome the air inclosed in the Cauldron, and resolve it into moisture. But if by due proportion (the Cauldron thus prepared) be softly set down into the water, the air inclosed in the Cauldron (by resistance of the water) shall violently make himself place, not admitting the water to enter. So the men there inclosed, shall so long remain dry in the midst of the water, untill success of time do by respiration weaken and consume the inclosed air. But if in due time the Cauldron be softly and equally drawn out of the water, the men shall remain dry, and the fire not extinct.

*This Experiment may thus be proved.*

Take a Cup or Glass of a certain quantity, the Circumference of the mouth whereof shall be broader then the Circumference of the bottom, in the mouth whereof let be fastened a little stick, tying thereto a thread and plummet. On the stick fasten a little Candle of Wax, whose light may come only to the midst of the Cup, lest too much nearness of the water might suffocate the Candle; Then proportionably (as in the former Experiment) put the cup with the burning Candle into a Vessel full of water, and in due time, draw it out softly and equally, so that no part of the mouth or Circumference thereof be drawn out before the whole, so shall the Candle remain burning as it was when it went in.

# X.

*What proportion ought to be used in the building of all Ships whatsoever.*

**T**HE due proportion of a Ship is that the Longitude of the Vessel whatsoever it be, more or less, ought to be divided into 300 equal parts, of the which parts 30 must be assigned to the depth, and the breadth shall contain 50, or the sixth part of the longitude, so shall the Ship be both proportionable, and more safe for Traffique.

# XI.

## XI.

*The Description of a Ship that cannot be drowned.*

**T**His Experiment was invented by one *Leonardo Fiorivanti* an *Italian*, who affirmeth that the like was never invented since the creation of the World: He describeth the said Ship on this manner, Take Beams of Firre or Pine-Tree, which of their own nature can never go down or sink, or abide under the water, and with these beams frame an Engine of the length of 60 foot, and 111 of the breadth of 20 foot, and of the height of 6 foot, laying the first rank in length, and the other traverse, and the third again in length, fashioning the forepart like unto other Ships, and in like manner bring the hinder part to good form, then with Irons binde it and fasten it that it cannot break, and upon this frame or foundation build your Ship of such fashion as you think best, so shall it be able to carry any voyage, without fear of drowning.

## XII.

*How to order a Picture, that if you look on the one side shall represent one thing, and on the other side another thing, and just before in a confusion.*

**L**et the two Pictures which you intend thus to order be both of one length and breadth, and provide a board of the same bigness about an inch thick,

thick, which must be planed in an indented form, (as are those boards which women use to pleat their Cuffs with, but the indentings must be a great deal bigger,) which provided, cause the Pictures to be cut ~~exactly~~ in long Labels of the same breadth as the sides of the indentings are, this done, with paste or fine starch, paste those Labels to the sides of the indentings, one on the right hand, and the other on the left hand, so proceeding till you have done all the Labels of the Pictures, then hanging it up, if you stand on the right side of the Picture, you shall see that Picture which was pasted on the right side of the indentings, and if on the left side of the Picture, the other, and right before in a confusion, which conceit hath caused no small admiration to those that know not the reason thereof.

## XIII.

*To break a Staffe upon two Glasses of water.*

**P**Lace the Glasses being full of water upon two joyn Stools, or such like equidistant from the ground, and distant one from another, the length of the Staffe; Then place the ends of the Staffe upon the edges of the two Glasses, so that they be sharp, this done, with all the force you can, with another Staffe strike the Staffe which lies on the Glasses in the midst, and it will break, without breaking the Glasses or spilling the water.

## XIV. To

## XIV.

*To make a Glasse of water seem to boil.*

**T**AKE a Glas neer full of water, and setting one hand upon the foot of it, hold it fast, turn slightly one of your fingers of your other hand upon the brim or edge of the Glas, having before privately wet your finger, and so passing softly on with your finger in pressing a little, the water will seem to boil and leap over the Glas by drops.

## XV.

*How to know the hour of the Day by the hand and fingers.*

**T**AKE a straw or the like, of the length of the Index, or the second finger, hold this straw very right between the thumb and the right finger, then stretch forth the hand, and turn your back and the palm of your hand towards the Sun, so that the shadow of the muscle which is under the thumb touch the line of Life, which is between the middle of the two other great lines, which is seen in the palm of the hand; this done, the end of the shadow will shew what of the clock it is, for at the end of the great finger it is 7 in the morning, or 5 in the evening, at the end of the ring finger, it is 8 in the morning, or 4 in the evening, at the end of the little finger, or first joynt, it is 9 in the morning, or 3 in the afternoon, 10 and 2, at the second joynt, 11 and 1, at the third joynt, and mid-day in the line following, which comes from the end

end of the Index ; Note, that this Experiment must be performed by the left hand.

## XVI.

*How to make two Images, one of which shall light a Candle, and the other blow it out.*

**U**PON the side of a wall make the figure of two Images, in the mouth of each put a pipe or quill, so artificially that it be not perceived, in one of which place Salt-peter very fine, and dry, and pulverised, and at the end set a little match of paper, in the other quill Sulphur, beaten small ; Then holding a lighted Candle in your hand, say to one of those Images by way of command, blow out the Candle, then lighting the paper with the Candle, the Salt-peter will blow out the Candle immediately, and going to the other Image, (before the snuff of the Candle be out,) touch the Sulphur with it, and say, Light the Candle, and it will immediately be lighted.

## XVII.

*How to disguise or disfigure an Image, as a head, an arm, a whole body, &c. So that it hath no proportion, the ears to be over long, the nose as that of a Swan, &c. yet the eye placed at a certain point, will be seen in a direct and exact proportion.*

**I** Will not strive to see a Geometrical figure here, for fear it may seem too difficult to understand, but I will endeavour by discourse how mechanically you may with a Candle perceive it sensible ; First, there must be made a figure upon paper,

such

such a  
and p  
upon  
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where  
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tract  
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such as you please, according to its just proportion, and point it as a Picture, afterwards put a Candle upon the Table, and interpose this figure obliquely between the said Candle, and the Books of Paper, where you desire to have the figure disguised, in such sort that the height pass a-thwart the hole of the Picture, then will it carry all the form of the Picture upon the Paper, but with deformity; follow these tracts and mark out the light with a coles black lead, or ink, and you have your desire.

To finde now the point where the eye must see it in its natural form, it is accustomed according to the order of Perspective to place this point in the line drawn in height equal to the largeness of the narrowest side of the deformed square, and it is by this way that it is performed.

## XVIII.

*How to make a Clock with one wheel.*

**M**AKE the body of an ordinary Dial, and divide the hour in the circle into 12 parts, make a great wheel in height above the Axle-tree, to which you shall place the Cord of your counterpoise, so that it may descend, that in 12 hours of time your Index or Needle make one revolution, which may be known by a Watch, then put a balance, which may stop the course of the Wheel, and give it a regular motion, and you shall see an effect as just from this, as from a Clock with many Wheels.

## XIX.

*To find what is bidden in two hands.*

**S**uppose that a man holds divers things in his hand, as Gold and Silver, and in the one hand he holdeth the Gold, and in the other the Silver, now to know which hand the Gold is in, and which the Silver, appoint for the Gold 4 shillings, and for the Silver 3 shillings, or any other prizes, so one be odde, and the other even, then bid him triple that which is in the right hand, and double that which is in the left hand, then bid him adde these two products together, and ask him if it be even, or odde; if it be even, then the Gold is in the right hand, if odde, the Gold is the left hand.

## XX.

*To make a Cone to move by the edge of a Table.*

**M**Ake therefore a Cone of Paper, and set it on the Table cunningly conveying under it a Beetle, or such like creeping thing, and you shall see the thing move on the Table, as if the paper were a living creature.

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**FINIS.**



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*FINIS.*